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Don Neel

ASSOCIATE PUBLISHER
Tina Vierra

SENIOR EDITOR
Elinor Pravda

ART & PRODUCTION MANAGER
Demitrius Handelih

CONTRIBUTING EDITORS
Eleanor Heald
Ray Heald
James Kennedy
Glenn McGourty
Bruce Zoecklein

CONTRIBUTING WRITERS
Craig Root
Dr. Richard Smart
Robert Tracy

ADVERTISING REPRESENTATIVES

WEST
Dana Johnson
707/433-1339

EAST / MIDWEST
Jim Oot
973/335-8902

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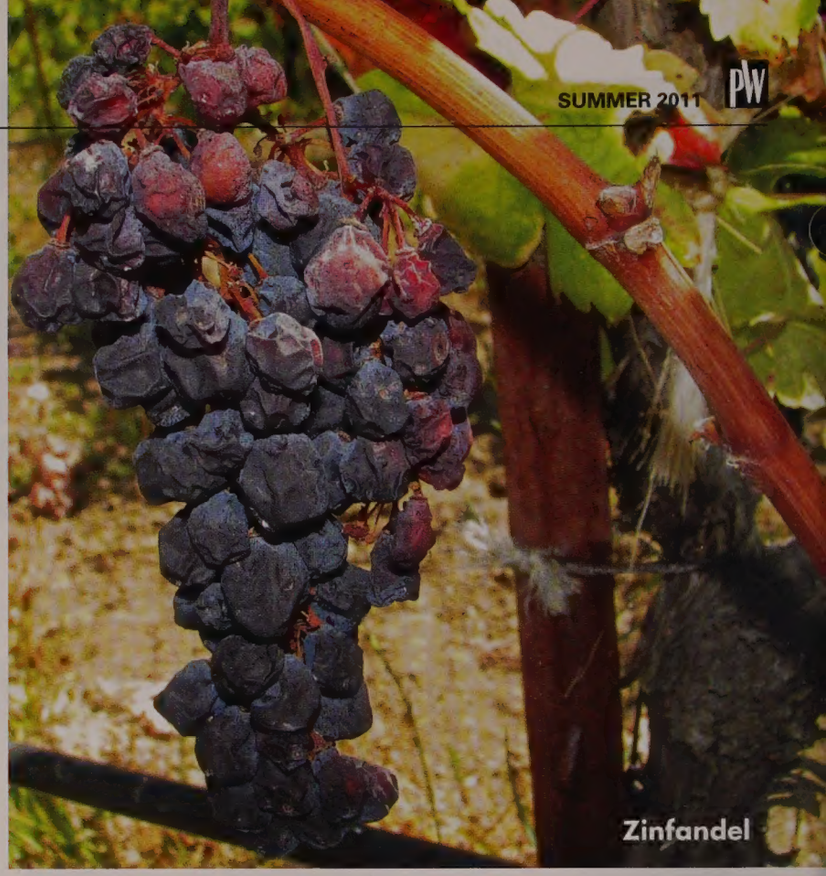

Zinfandel

BY Rhonda Smith, University of California Cooperative Extension, Sonoma County

Grape clusters were damaged by weather conditions August 23-25, 2010 that at first seemed to be a typical summer heat spike, but turned out to be quite different. High temperatures coupled with low relative humidity provided conditions that caused more fruit damage then in "normal" heat spikes.

Not every vineyard had heat-damaged fruit, and in those vineyards that did, sunburn and/or desiccation varied considerably. Fortunately, such weather conditions are rare in the North Coast region of California.

There was usually — but not consistently — a clear association between cluster exposure and severity of damage. For most growers, fruit in blocks with vine rows oriented north-south suffered more damage than fruit in other blocks. In general, clusters exposed to direct light either in late morning or afternoon were partially or completely damaged.

Damage on the exposed surface of clusters was obvious within 24 hours as berries collapsed and turned off-color. About 10 days later, damage to the rachis became apparent in clusters that initially appeared undamaged, at which time pedicles and portions of the rachis were dead.

The severity of damage varied by site but not consistently. Specific blocks that received ample water in spite of the cool growing season were not impacted whereas other blocks were. Physical characteristics of the site including elevation, aspect, height of fruit above ground, and variety contributed to the variability in observed damage.

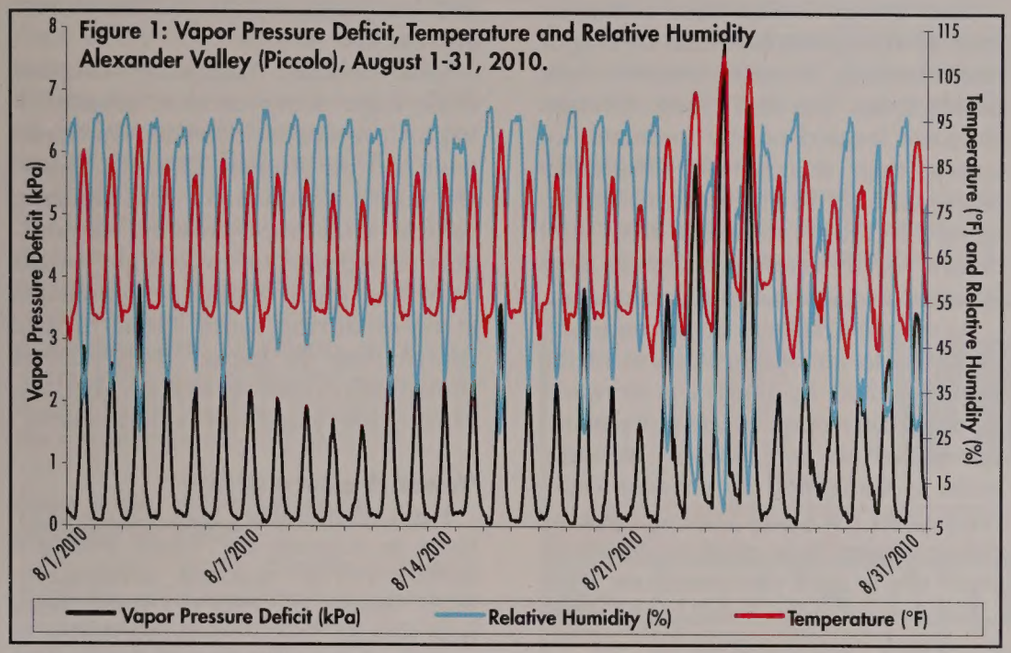
A few growers turned on sprinklers during the hottest period of the day to initiate evaporative cooling inside the vineyard to reduce or prevent fruit damage.

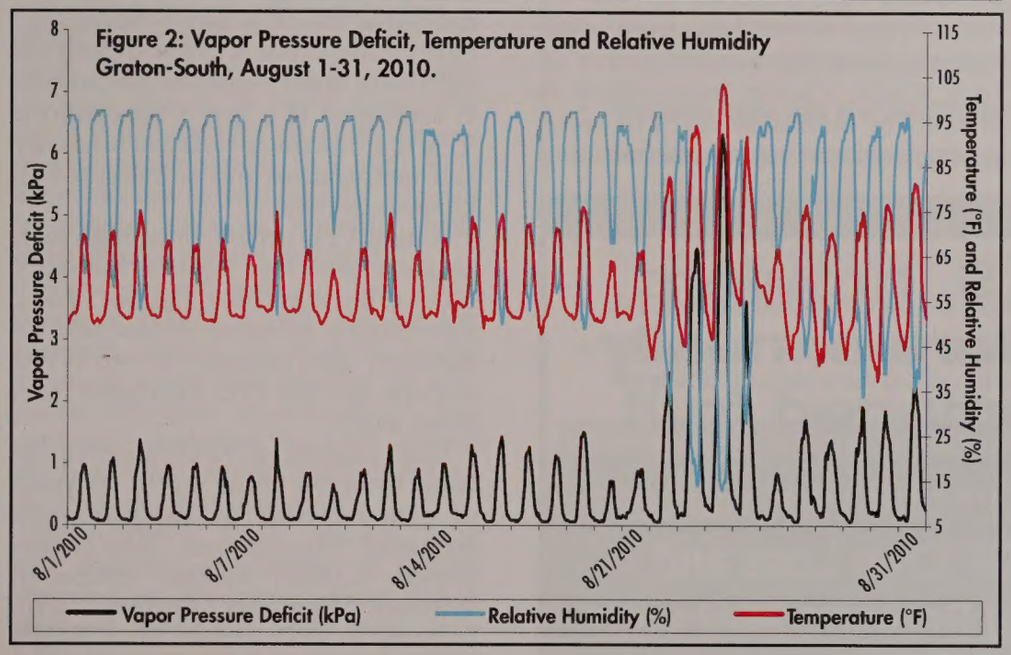
Disease pressure and canopy management

Mild temperatures in spring and early summer coupled with dense, wet canopies increased the incidence of powdery mildew and Botrytis infections. As a result, in late July and early

Fully exposed Riesling clusters damaged during period of high temperatures and low relative humidity.

Uneven color development in Merlot clusters caused by high temperatures.





August, some growers opened up vine canopies more than usual to allow more light (thus heat) into the fruit zone and reduce disease severity.

Beginning August 23 when temperatures climbed, many exposed clusters were damaged. Affected vineyards were not limited to those with fully exposed clusters, as standard leaf removal on the morning sun side of vine rows resulted in cluster surfaces with a range of exposures from direct (full) to indirect (diffuse) light.

Were clusters acclimated prior to the heat?

Clusters are considered acclimated if they are exposed to light sooner rather than later in the growing season. Removing leaves shortly after berry set is ideal, and exposing clusters just before veraison should be avoided. In most years, nearly all leaf removal is completed well before berry softening, but greater canopy growth in 2010 presented challenges.

Generally, cluster acclimation can protect clusters against normal heat spikes; however for several hours on August 23-25, temperatures exceeded seasonal norms. Berry temperatures are generally warmer than leaf temperatures, and when ambient temperatures exceed 104°F, clusters in direct

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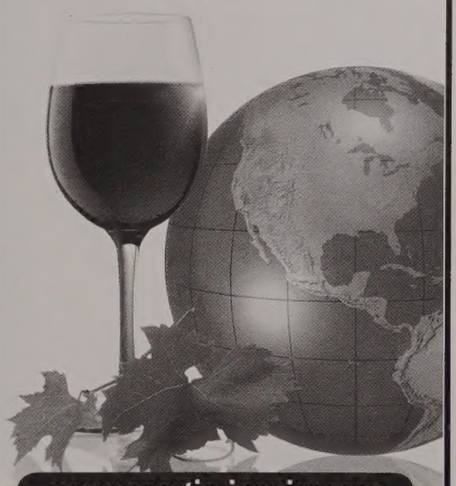

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sunlight for more than two to three hours will likely experience sunburn even if vines are well irrigated. [Larry Williams, personal communication]

Several factors affect berry surface temperature, most importantly wind velocity, solar radiation at the berry surface, and cluster compactness. The surface temperature of fully exposed berries can be 18°F greater than ambient under typical midsummer conditions, and some researchers report greater differences.

Maximum air temperatures recorded August 24 by **all** weather stations operated by Western Weather Group (WWG) in Sonoma County ranged from 105° to 114°F. In summer, vines must remove some of the heat energy they receive from incident solar radiation. Physical processes allowing vines to remove heat are affected by vine water status and air movement inside the canopy (which affects the extremely small "boundary layer" at the leaf and berry surfaces).

Heat energy is lost from leaves by transpiration, which results in evaporative cooling. In transpiration, water passes from the leaf blade through stomates located on the underside of leaves, then through the boundary layer just prior to evaporation. Berries have far fewer stomates than leaf blades, and by veraison, stomates have lignified and are not functioning.

As maturing berries do not regularly transpire to remove heat, most of the heat absorbed by berries is removed through convection by air movement.[2] Compared to leaf blades, minimal water is transpired by clusters, especially after veraison; thus in general, cluster water loss plays a relatively small role in total vine water use.

Regardless of the small effect water loss from ripening fruit has on the entire vine, water loss from clusters can have significant impact on fruit weight. Cluster transpiration is affected by both differences in vapor pressure (water vapor concentration) and temperature between the cluster and the air.

Low relative humidity coupled with high temperatures created a vapor pressure difference between fruit and air August 23 to 25, to levels rarely experienced in California coastal winegrape-growing regions. Berries exposed to direct light would have had much higher temperatures at times during those dates, further contributing to higher than normal transpiration rates in exposed berries, causing berry and rachis desiccation.

Vapor Pressure Deficit

High temperature was not the only issue in August; the **vapor pressure deficit** (VPD) reached abnormally high values on one or more dates that month. Vapor pressure deficit is defined as the difference between how much water vapor is in the air, and the amount of water vapor the air can hold at saturation at a given temperature. VPD is a function of relative humidity and temperature and is measured in kilopascals (kPa).

A high VPD occurs when high temperature and low relative humidity occur at the same time. Figures 1 and 2 show hourly temperature and relative humidity data recorded at two WWG stations and the VPD calculated from those data.

Daily maximum VPD values calculated from the most recent 20 years of data recorded by the California Irrigation Management Information System (CIMIS) weather station in Windsor (Sonoma County, CA), indicate a VPD greater than 6 kPa occurred on 16 dates. That calculation assumed the maximum temperature occurred at the same time as the lowest relative humidity on each date. Since that was not likely to occur on all 16 dates, it is safe to say that a VPD over 6 kPa is very rare in Windsor. In the central San Joaquin Valley, daily maximum VPD values can reach 7 kPa, but that is also rare.

Weekly VPD measurements we recorded in 2009 between 1 PM and 3 PM from late July through October in an Alexander Valley vineyard, ranged from 1.94 to 4.36 kPa. We did not record measurements in 2010; however, a new WWG station in Alexander Valley (just a few miles

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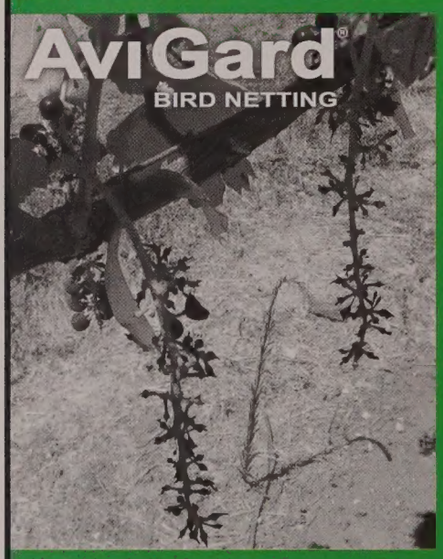

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from the 2009 vineyard site) records data every 15 minutes and generates hourly reports. VPD calculated for the same dates and hours in 2010 as we measured the previous year ranged between 0.92 and 6.47 kPa.

On August 24, 2010, the maximum VPD soared to 7.69 kPa (Figure 1). That day in Graton, the maximum VPD was 6.34 kPa (Figure 2). As a point of reference, that day in Parlier (about 20 miles southeast of Fresno) the maximum VPD was 6.59 kPa (calculated from CIMIS weather station data in the manner previously described).

How is leaf water potential affected by VPD?

At some point during summer, available soil moisture from previous winter rains is significantly depleted and shoot tip growth slows; this is about when many growers start to apply water. The amount of water growers choose to apply from that point to harvest will affect the degree of vine water stress. If a high VPD event occurs, it will usually happen in summer when soil moisture levels have been purposely depleted.

Some growers measure leaf water potential (LWP) weekly during the growing season to monitor water stress in vines and modify an irrigation schedule accordingly. A few growers noted that the LWP during the heat spell was not much different than during the week prior.

Researchers have shown that soil moisture availability of deficit-irrigated or dry-farmed vines has a stronger effect on LWP than does VPD. Reduced water in the soil profile causes leaf stomata to become smaller, which reduces conductance and transpiration. In studies, LWP of moderately stressed vines (LWP less than -12 bars) did not change significantly over a wide range of VPD conditions.[3]

Take home messages

On very hot, dry days in midsummer, vines under moderate (or greater) water stress or unirrigated vines will not transpire at significantly greater rates than they would under milder conditions; therefore, they will not lose significantly more water than during "normal" summer days. On the other hand, clusters can lose a significant amount of water by transpiration in those conditions as compared to "normal" summer days, and depending on severity, sunburn or worse may result.

Things to consider

Cluster exposure, and thus berry temperature, is affected by many factors including row orientation, trellis design, water management, leaf removal, and sprinkler cooling. If sunburn is a common problem in a block, then the objective should be to reduce direct solar radiation on fruit, and to have adequate soil moisture when needed. That is easier said than done. However, what follows are some things to consider:

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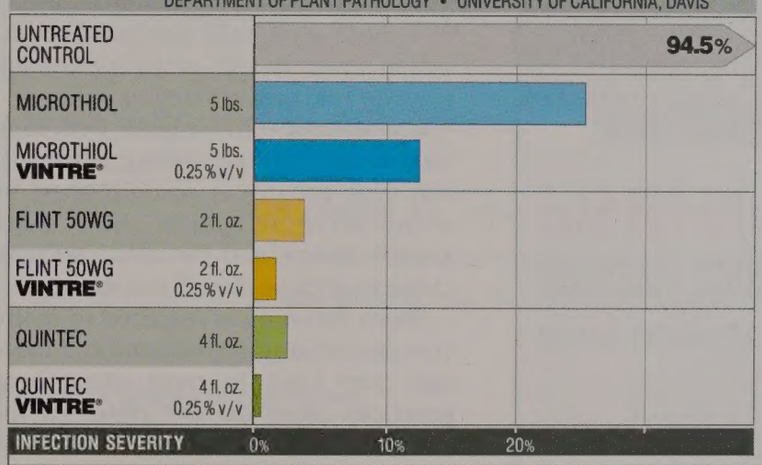

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ROW ORIENTATION – This is often determined by the shape and size of the land available for planting, configuration of adjacent blocks, slope, wind direction, land use of adjoining parcels, etc. Practical considerations and logistics usually have the strongest impact on vineyard design; however, the correct row orientation can reduce the risk of sunburn and heat damage, especially in warm, low vigor sites.

Vine rows oriented north-south intercept more sunlight compared to east-west. In warmer coastal regions, trellis systems designed to confine shoots to a narrow zone, combined with normal production practices of leaf or lateral shoot removal, often result in over-exposure of fruit to sunlight. Offsetting vine rows by 25° to 45° from true north-south to northeast-southwest orientation reduces direct exposure of fruit during the warmest period of the day.[1]

TRELLIS DESIGN – A vertically shoot-positioned (VSP) trellis is the most common type used in the North Coast and is ideal for low to moderate vigor sites because vine rows can be spaced more closely together.

If row orientation results in excessive cluster exposure, some growers have added cross-arms to widen the canopy, or modified shoot orientation on the afternoon sun side of the vine row to allow foliage to better cover clusters. Such adjustments are limited because of the need for adequate distance between already narrow tractor rows. If (true) north-south rows are the only option, do not use a VSP trellis; cross-arms will be essential to provide fruit shading.

WATER MANAGEMENT – Controlling canopy growth by regulating water to achieve yield and quality goals is fundamental to winegrape production. If sunburn and/or heat damage regularly causes crop loss, then working to better understand water relations for canopy management purposes in those blocks can benefit fruit quality.

Regularly monitoring both soil and vine water status will allow growers to see the effects of applied water and soil water disappearance on specific objectives for shoot growth, berry size, and ripening.

Knowing the relative amount of water vines can extract in high evaporative demand conditions **and** how quickly that moisture can disappear, will allow you to apply the right amount at the right time to minimize vine stress. Applying water each day of a heat spell will not reduce vine water stress if soil moisture content was too low before starting.

LEAF REMOVAL – In a region with high winter rainfall, controlling early season vine growth is accomplished by withholding irrigation until shoot growth slows, and by utilizing cover crops to deplete stored soil moisture.

Shoot thinning is required to maintain desirable spur positions and manage crop load. In most sites, those practices alone do not result in the desired level of fruit exposure; however in low vigor sites they may.

The quantity and quality of light on clusters and the timing of exposure has significant effects on fruit composition. The goal is to create a light environment in the canopy that achieves fruit quality targets yet avoids excessive heating of clusters. If a site frequently experiences sunburn or heat damage, then the severity of leaf removal must be reduced to improve quality.

In cool, foggy regions, leaf removal is essential for disease control and for fruit exposure, as dense canopies are common due to high soil moisture. Because hot periods are more infrequent than in warmer regions but not absent, determining optimal cluster exposure is more challenging in these regions.

SPRINKLER COOLING – Utilizing sprinklers for evaporative cooling is an option for some growers. When weather forecasts predict expected high ambient temperatures around 100°F or greater, sprinklers — either traditional impact or targeted systems — can be used to achieve evaporative cooling.

Most research with over-vine sprinklers to achieve cooling has been conducted with impact sprinklers, which provide total vineyard floor coverage.

Over-vine targeted sprinklers and under- or over-vine micro-sprinklers, misters, etc. have also been used to provide cooling with reduced water use. Temperature sensors inside "protected" blocks allow determination of when temperatures stabilize after turning on sprinklers, and help growers meet water conservation goals.

Sprinkler irrigation time required to reduce and stabilize vineyard temperatures may be surprisingly short, at which point there is no further temperature drop by maintaining overhead cooling. After the system is turned off, the cooling effect will continue as water evaporates off vine surfaces. The duration of this effect can be measured by temperature sensors in the vineyard block. ■

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DIFFERENTIAL HARVESTING IN WINEGRAPE VINEYARDS

BY **S. Kaan Kurtural,** Department of Viticulture & Enology, Bronco Wine Company Viticulture Research Chair, California State University – Fresno,
Robert L. Wample, Viticulturist, Soil Topography Information, Fresno, CA,
Russell Smithyman, Director of Viticulture, Chateau St. Michelle Estates, Prosser, WA

Spatial variability in vineyards is a major factor contributing to variations in wine composition and quality. Winegrape growers and winemakers have recognized this for decades, and despite their best efforts to minimize the problem, it still exists.

Abiotic factors such as soil nutrient status, soil water holding capacity, and climate are major contributors to spatial variability in vegetative growth, fruit yield, and composition. Failure to consider spatial variation in fruit quality during harvest limits opportunities to optimize wine quality by fermenting separately in order to maximize the potential within segregated fruit blocks.

Spatial variability in fruit composition is not consistent with yield variation in a given vineyard,[1] indicating that factors controlling fruit composition are more complex than yield formation. Therefore, the latter cannot be used as the sole criterion upon which to manage wine quality.

Variable irrigation and nutrient management by drip irrigation has helped minimize variability in vine growth and fruit composition. However, other factors such as the mesoclimate of a given vineyard and its interaction with the canopy microclimate still make it difficult to predict fruit composition at harvest.

A three-year study has shown consistency in the spatial variability of yield.[1,2,3] However, even though spatial variability was similar across years, the range of yield was different. Growers need to understand the source of this variability in order to develop more precise and uniform vineyard management practices.

Differentially harvesting of vineyards both spatially and temporally can help overcome this problem. The latter would entail looking at variations in viticultural characteristics over time, such as changes in berry color from green to blue with veraison, clusters becoming a stronger sink for photosynthates at the onset of ripening, or changes in shoot attenuation.

However, measuring temporal variation in vineyards is generally not economically feasible for most large operations. There is a clear need to develop on-the-go winegrape fruit composition sensing, that would enable fruit composition zone delineation for effective harvesting and management of vineyards.[1] Until some form of zone management is adopted in vineyards, delivery of more uniform fruit composition at harvest is unlikely.

In the absence of on-the-go fruit composition sensing in winegrapes, and with the poor association between yield and fruit composition within vineyards, both temporally and spatially, researchers decided to investigate alternative methods to segregate fruit in the vineyard.

Figure 1A (TOP RIGHT): Harvest operator and geo-located quality zones at Twin Creeks Vineyard.

Figure 1B (TOP LEFT): Differential harvest of Cabernet Sauvignon grapes with Korvan 3016XL. Grapes of different quality based on berry skin anthocyanins are delivered to two separate gondolas.

Figure 2 (ABOVE): Differential harvest guidance at Chateau St. Michelle Estates (Prosser, WA) using off-the-shelf equipment.

Below are two similar approaches from Washington and California, where geographic information systems are utilized to identify "quality zones" (Quality A and Quality B) within vineyards. These identified quality zones were used to manage a grape harvester for separating fruit located in these quality zones. This segregation enabled two wineries to produce different quality wines, rather than wines that were a blend of different grape qualities from the vineyards.

St. Michelle Wine Estates differential harvesting experience

Precision viticulture utilizes many tools and technologies that allow vineyard attributes to be measured and displayed at high spatial resolution. By using this information, more precise management decisions can be made that increase the likelihood of producing more uniform fruit compared to conventional viticultural management.

One method of identifying variation within a vineyard is by utilizing aerial multi-spectral imaging to create normalized difference vegetative index (NDVI) maps. This process measures the proportions of light reflected back in the visible and near infrared wavelengths, and indicates the amount of leafy plant material. The more reflectance measured in the near infrared bands, the greater the amount of healthy plant material.

In the case of winegrapes, more is not necessarily better. Vigorous vines with greater leaf area produce larger berries that ripen later, with increased vegetal flavors. Vine stress at appropriate phenological stages reduces vigor, and results in smaller berries that have more intense flavors and ripen earlier. More important, NDVI mapping has the potential to provide identification of canopy characteristics that produce fruit for specific wine styles.

In 2003, Ste. Michelle Wine Estates (Prosser, WA) began using remote sensing to investigate if it could provide information on canopy density and hence grape maturation. The goal was to identify areas within vineyards with differing quality parameters, and then harvest those zones separately to provide winemakers with the flexibility to blend different fruit characteristics together when creating a desired wine style.

Initially, blocks were divided into as many as ten different vigor zones, which became unmanageable with the fruit quality differences too slight between zones. However, there were significant differences between high and low vigor zones. Two of these differing vigor zones were then identified from the NDVI mapping, and perimeter vines were flagged. Maps were distributed to hand-harvest crews to follow, but the harvest proved to be time-consuming and expensive.

Efforts to separate grapes with a machine harvester proved inefficient, especially with night harvesting. Selecting and harvesting vigor zones by entire vine rows was attempted next. Although it reduced the accuracy of the zonal harvest, four out of five tasters were able to distinguish wines produced from differentially harvested blocks.

A method to more precisely harvest vigor zones was created in 2006. A signaling system was developed to facilitate communication between the harvester operator and gondola drivers who receive fruit from the

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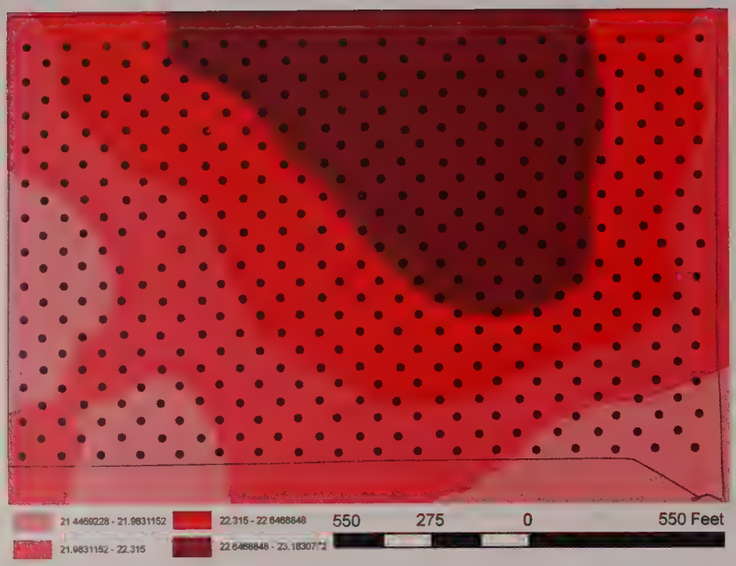


Figure 3A: Map of fruit composition (Brix) at Twin Creeks Vineyard that was used to determine harvest date of Cabernet Sauvignon grapes.

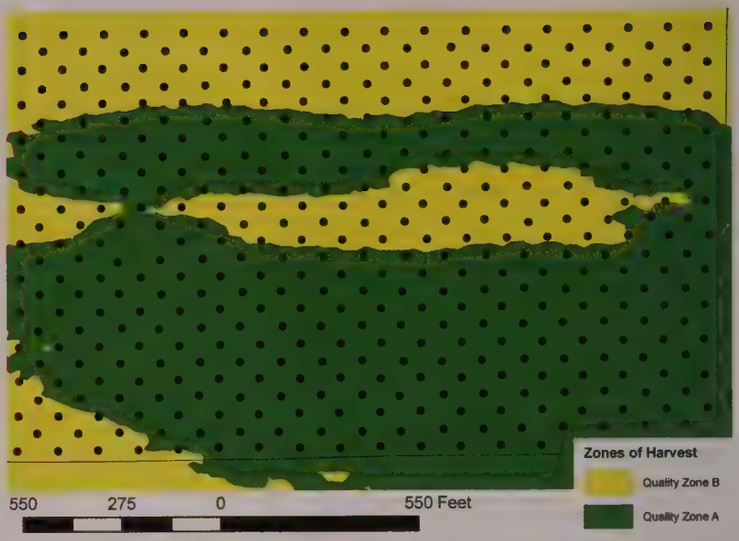
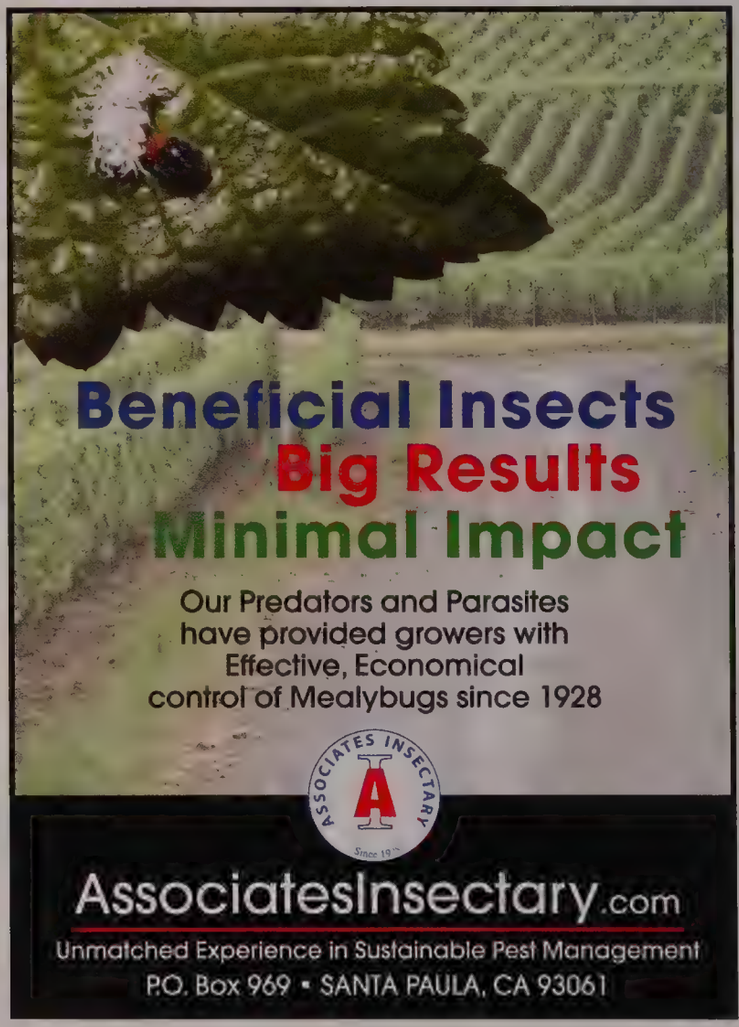


Figure 3B: Quality zones identified based on berry skin anthocyanin concentration measured with near infrared spectroscopy at Twin Creeks Vineyard (Galt, CA) that were used to guide the Korvan 3016XL harvester to differentially harvest grapes.

harvester in the vineyard. The system employed a signal bar with a series of lights (red, white, and amber) that were controlled by a personal digital assistant (PDA) with a Global Positioning System (GPS) card.

NDVI maps were loaded into the PDA, and signal lights were turned on and off based on the harvester location within the vineyard. NDVI maps were prepared with polygons created around the high- and low-vigor zones,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with a 15-foot buffer to allow gondola drivers working with the grape harvester time to make changes.

Two gondola drivers followed each other down the row, with each designated a specific light color or vigor zone. Each gondola moved into position to receive fruit from the harvester when their designated light was illuminated. The fruit was then taken to different trucks and delivered to the winery, where separate wines were produced.

These trials of differentially harvesting vineyards based on NDVI mapping have demonstrated that selectively harvested grapes can produce premium wines and provide winemakers with more blending options.

In addition, the equipment was inexpensive to construct and the process was efficient and easy to use. The signal bar was constructed for $200, software to coordinate the harvester and gondolas was purchased for $1,500, and it cost $3 per acre for the aerial imagery (Figure 1).

Using the harvester signal to perform differential harvesting required minimal additional time or expense. Ste. Michelle Wine Estates has currently expanded their vineyard mapping using NDVI to 90% of their own acreage and has begun imaging selected contracted blocks outside company vineyards.

Each year, Ste. Michelle Wine Estates obtains 25 to 30 aerial images of various varieties to identify weak spots or large variations within blocks and document year-to-year variation in yield. The company collects up to 20-ton press lots of Riesling by differential harvesting, and 10-ton fermentor lots for Cabernet Sauvignon and Merlot from the company vineyards of Horse Heaven Hills, Cold Creek, Canoe Ridge Estate, and some contract growers.

NDVI mapping has also proven to be an effective tool for facilitating pre-planting decisions, irrigation maintenance, and canopy management, including damage assessments resulting from pests, disease, or growing conditions. However, the greatest return on investment has been the ability to provide winemakers with more uniform fruit, increased blending options, and the potential for improved quality.

Woodbridge Winery experience – Twin Creeks Vineyards and Merjan Vineyards

A similar but more detailed approach to quality zone delineation and differential harvesting in winegrape vineyards was attempted in 2006, with cooperation between Woodbridge Winery and its Twin Creeks Vineyards near Galt, CA. A mature and producing 45-acre block of Cabernet Sauvignon vineyard was chosen for fruit composition mapping and differential harvest. Fruit composition parameters of berry anthocyanin content (mg/g of fruit) and total soluble solids (Brix) were

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TABLE I: Summary of sensory evaluation of differentially harvested Cabernet Sauvignon grapes from Twin Creeks Vineyard

QUALITY A Wine Sensory Attributes	QUALITY B Wine Sensory Attributes
More intense aroma	Bitter aftertaste
Slightly sweet aftertaste	Less astringent
Cleaner fruit taste, acidity more clear	Metallic taste
Slightly higher aroma	Vegetative flavors
Strong flavor	-
Raspberry aroma	-

utilized to estimate different quality zones in the vineyard.

Sample sites in the vineyard were geo-located using a Trimble handheld Global Positioning System and receiver with a sub-meter positional accuracy. A near infrared spectrometer (NIR) was used to simultaneously measure berry anthocyanins and Brix in the field to supply data for the map projections.

Wet chemistry was conducted on roughly 30% of the samples to help validate the calibration of the NIR device. The calibration curve displayed a strong affinity to detect Brix; however, there were some anomalies for anthocyanins. Other values such as titratable acids were measured with the NIR but were not used for mapping.

Geo-located NIR data collected during ripening was processed in Geographic Information System (GIS) software used to create continuous map projections of berry anthocyanin and total soluble solids before harvest and delineate quality zones. Based on the geostatistical analyses of anthocyanin and total soluble solids concentration of fruit, blocks of the vineyard with more than 0.87 mg of anthocyanins/g of fresh fruit were labeled as "Quality A" and the rest as "Quality B."

A geo-located map (Figure 3B) was loaded to the control unit of the grape harvester for differential harvesting. The same approach was utilized for delineation of Brix in the vineyard, but only to determine the timing of harvest, not for differential harvesting (Figure 2B).

The geo-located map indicated that 64% of the vineyard fell within the Quality A class. There was very little effect of yield (tons/acre) or crop load (ratio of yield to pruning weight) on fruit quality at harvest. Tonnage at harvest varied between 5.4 tons and 12.2 tons per acre. The mean yield of one block of Cabernet Sauvignon was 7.2 tons/acre.

Differential harvesting in the Twin Creeks Vineyards was accomplished by retrofitting a Differential Harvest Attachment (DHA) to a Korvan 3016XL bow-rod shaker grape harvester. The Korvan 3016XL is equipped with an Over the Row (OTR) conveyor that can deliver harvested grapes to either side of the harvester. Differential harvesting was accomplished by controlling the direction of motion of the OTR that delivered the fruit either to the left side or right side of the harvester.

The geo-located quality map (Figure 3B) was loaded to an AgLeader Insight Monitor. When the harvester traveled into Quality A zone the systems read the signal (Figure 1B) and activated to change the direction of the OTR conveyor to deliver fruit from Quality A zone to the gondola on the left and vice versa (Figure 1B).

Differentially harvested fruit from zones Quality A and Quality B were delivered to Woodbridge Winery and fermented separately. The resultant wines were subjected to sensory analysis and taste panel examination (Table I). The sensory panel deduced that wine made from Quality A was different than wine made from Quality B 94% of the time.

Constellation Wines experience with Merjan Vineyards

Based on the successful implementation of grid-based sampling of yield components and remote sensing quality attributes at Twin Creeks Vineyard, Constellation Wines conducted a differential harvesting experimental trial in 2007 at Merjan Vineyards (Madera County, CA). a 159-acre block of Cabernet Sauvignon.

Merjan Vineyards was managed with mechanical box-pruning to a fruiting zone (5.5 to 6-inch box) and irrigated using regulated deficit irrigation. During the growing season, 1,347 vines (roughly nine sites per acre) were sampled multiple times for different yield and quality parameters. The vines were sampled for number of clusters borne per foot of vine row, cluster weight, and yield per vine. Fruit composition was sampled weekly, from when juice total soluble solids reached 14° Brix until harvest.

A block of 698 vines was sampled for berry skin anthocyanin content using a handheld NIR and traditional wet chemistry in both years to delineate quality zones, "Quality A" and "Quality B." Based on the geo-statistical analyses of anthocyanin and total soluble solids concentration of fruit, vineyard blocks with more than 0.75 mg/g of anthocyanins in fresh fruit were labeled as "Quality A" and the rest as "Quality B."

A geo-located map was loaded to the control unit of the grape harvester for differential harvest. The same approach was utilized for delineation of total soluble solids in the vineyard but only to determine time of harvest, not for differential harvesting, as in the Twin Creeks Vineyard trial.

Differential harvesting was conducted with methods developed in the previous year. At the Merjan Vineyards in both years of the study, the quality zones varied very little, as about 72% of the vineyard fell within the "Quality A" designation with the rest being delineated as "Quality B." Yield per vine varied between 4.5 lbs/vine to 22.8 lbs/vine, having little to no effect on berry skin anthocyanin concentration that was measured.

Today, very little differential harvesting is being done on a commercial scale in the San Joaquin Valley. However, the methods developed in these case studies will help make differential harvesting based on quality zones a reality should the market demand it.

Take-home message

Experiences in Washington and California both resulted in quantification of variability in winegrape quality indicators, depending on which method was utilized to assess them. Using precision farming methods, coupled with sensing in the vineyard, growers can identify potential quality

zones in a vineyard. Subsequently, using the identified zones, they can differentially harvest each zone based on quality, as demonstrated above.

Our capabilities at this time, without the ability to sense fruit composition on-the-go, are limited to:

1) Generating quality zones based on a tight sampling grid;

2) Guiding a mechanical harvester to harvest differentially, with off-the-shelf items, utilizing the quality zones generated;

3) Delivering fruit to different gondolas and separately fermenting them based on quality zones; and

4) Possible zone management in subsequent seasons to express desirable fruit composition.

Wine sensory analysis from the California case study demonstrated that consumers are able to differentiate between wines from different quality zones. This technology would enable wineries to more effectively and efficiently allocate winegrapes to fermentation programs and subsequently to produce higher quality wines more economically. Moreover, identification of the quality zones within a vineyard block also paves the way towards effective decision making and site-specific management of vineyard production. ■

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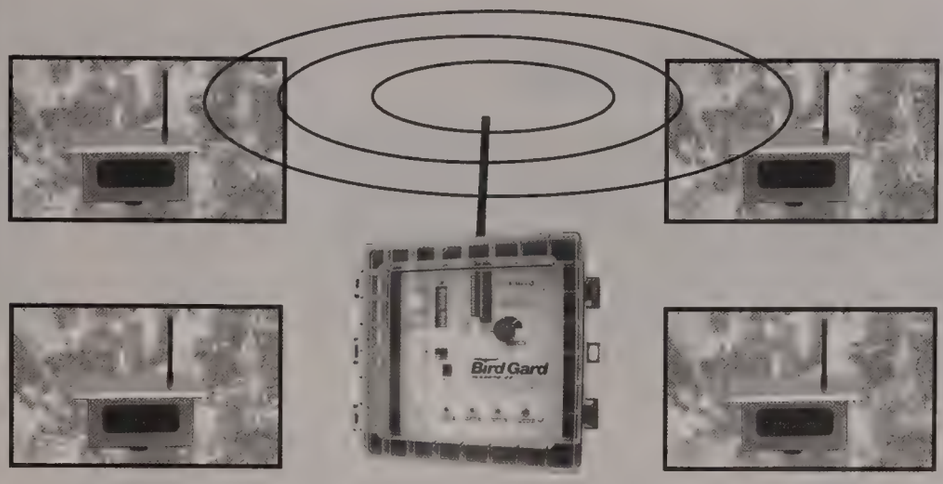

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BY Joe Chauncey, Boxwood, Seattle, WA

Chris Figgins, owner/winemaker for Leonetti Cellar and son of Leonetti founders Gary and Nancy Figgins, is creating a brand and identity for a new family of companies. He is expanding the family's interests beyond wine into luxury food products that pair well with their wine offerings. As the CEO/Director of Winemaking and the creative head of this new company, he asked Boxwood to become a member of his team to help realize this dream.

Figgins Family Wine Estates would encompass Leonetti Cellar and three new companies to start. As the family business offered new products, additional brands would be added under this umbrella. Leonetti Cellar is known for setting an exceptional standard of quality and the new venture would remain true to this legacy.

FIGGINS is a new single estate red wine from a 32-acre FIGGINS Estate Vineyard planted in 2004, with the first vintage due to be released in the fall of 2011. Lostine Cattle Company, offering free-range, grass-fed beef, was launched in 2010.

Within a few years another winery named Serra Pedace will begin production — the vineyard is located on the Oregon side of the Walla Walla Valley AVA. These projects are diverse, exciting, and full of history, imagery, and most importantly, family stories.

Getting started

All Boxwood projects begin with a deep dive and this one is no exception. Boxwood designers submerged themselves in research, first reading everything available about the Leonetti and

New Leonetti bottlings will carry the Figgins Family Wine Estate mark, embossed on the bottle shoulder and printed in the label text.

Figgins names — their meaning, geographical and historical origins, and the roots of the family tree.

Chris is a second-generation winemaker. His father and mother bonded Leonetti Cellar 32 years ago, after Gary and his uncles planted the first vineyard on the Leonetti family homestead. In fact, winemaking has been in the family since Gary's mater-

FIGGINS ESTATE VINEYARD

Figgins Estate Vineyard lies below the Blue Mountains at the northeast end of Walla Walla Valley along Mill Creek. Sloping south/southwest from 1,750 to 1,500 feet, the 60-acre estate receives an average 22 inches of rain annually and experiences 40°F diurnal temperature swings at sunset as cool mountain air drains down into the valley. The location, aspect, elevation, and very deep Walla Walla silt loam soil make it ideal vineyard land.

Chris Figgins and his father Gary studied the site carefully to determine what grape varieties would achieve the highest potential wine quality. Forty years of cumulative viticulture experience in Walla Walla Valley led them to plant 23 acres of Petit Verdot (6x9 vine spacing), Merlot (6x9), and Cabernet Sauvignon (6x7) with vertical shoot positioning trellis, plus nine acres of Cabernet Sauvignon (4x11) on the lyre system, and a small block of Riesling (6x9).

Jason Magnaghi (Figgins Family Wine Estates vineyard manager) employs VINEA Winegrowers' Sustainanable Trust practices. Each block is separated by a biodiversity buffer. More than five acres of wildflowers planted in buffers create habitat for predators and parasitoids, eliminating the need for pesticides. Limestone end posts were installed at the end of vine rows. The stone artifacts, handquarried in the 1860s and used as fence posts in Kansas, reduce the need for treated wood and honor the Figgins side of the family, who homesteaded in Kansas when they moved from Great Britain.

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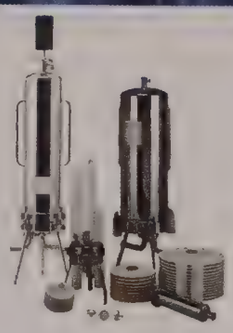

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nal grandparents, the Leonettis, immigrated to Walla Walla from Serra Pedace, Italy in 1905.

The importance of family has been evident for generations. The family embraces its history — so much so that each generation strives to improve on the past out of respect for their heritage. This notion of honoring the past while looking to create a better future inspired the new company logo.

The logos with two F's can be interpeted in two ways. The most visually obvious is the initial capital mark for the Figgins Family. However, the design is really meant to show how the family thinks and lives.

Piero Antinori, with 26 generations of Italian winemaking history in his family, states:

"The centuries and the ancestors have left us as an inheritance — a mysterious imponderable consisting half of satisfaction and half of discontent. This prompts us to try new approaches to enlarge and deepen our prospects — aware as we are that the vast potential of our possessions and structures and, above all, our resources and the character of our personnel is not fully expressed."

Although each company under the Figgins Family Wine Estates umbrella has its own identity, the double F mark can be found on each of their websites and collateral material, and it always has the same subtle, embossed, three-dimensional appearance.

Brand reinforcement through custom glass

The new company logo is prominent on the wine bottle itself. Early in the decision process, it was decided that all wineries under the FF badge would use the same bottle. The purchasing power of multiple wineries and varieties allowed Chris and his team to purchase a unique, embossed bottle and have it still be cost-effective.

The classic Bordelaise 1855 bottle from SaverGlass was selected as a starting point. Chris liked the appearance and how the base of the bottle settled onto a table with a tight, smooth radius. The 1855 is tapered and weighs 26.8 ounces. Chris wanted straight sides and a lighter weight bottle that would be more sustainable — using less glass would mean that the bottle would cost less to ship, and reduce the carbon footprint. The new custom bottle weighs 25.9 ounces.

The 1855 digital design was mocked up with straight sides and the double F logo in raised letters was placed on the shoulder of the bottle. The existing label for Leonetti wine (designed by Chris's father three decades ago) and the label for the new FIGGINS wine were overlaid, and the size and location of the raised lettering were adjusted. Leonetti will get a new Figgins Family capsule, which will match a family of capsules in varying colors created for each wine.

What's in a name?

More than one source indicated that the name Figgins meant "the son of

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Fig," and the name Fig denoted either a person who lived by a fig tree or who sold figs in a market. Job-descriptive names like Fig later became surnames. If you trace the lineage of figs themselves, many believe that Adam actually took a bite out of a fig, and not an apple, in the Garden of Eden.

Figs are associated with vineyards, with Bacchus and Dionysus, and interestingly, figs likely originated along the shores of the Mediterranean Sea and can be found in abundance in Serra Pedace, the birthplace of this Leonetti family.

For all of these reasons, the fig was chosen as the mark for the new FIGGINS wine brand. A botanical rendering of a fig plant was used for the letterhead and the "artist series" label will have a new fig for each vintage created by an artist of the winemaker's choosing.

The overall appearance of the FIGGINS wine label is a broad swath of white, a stark contrast with the Leonetti Cellar's dark gray and burgundy-colored label. The label, printed by Label One Connect (Portland, OR), is 60 lb. white Kromekote – Technicote paper wrapping three quarters of the way around the bottle. The label is printed on an Iwasaki TR2 offset press in four colors and finished with two coats of Actega aqueous soft touch that makes one want to hold and caress the bottle. The artist's bold fig in the center of the "canvas" and the vintage date provide the only color. In short, the label is designed to be noticed, to stand out, and hold one's attention long enough to appreciate the quality of the package — a prime indicator of the quality in the bottle.

The required and descriptive text is in two shades of charcoal gray that settles into the paper rather than sitting on top of it. Only two fonts are used on the label and both are simple, bold, and understated. To the right of the fig are the FIGGINS Estate Vineyard statistics and descriptions, offering some reasons why the wine in the bottle is so exceptional, and its relationship as a suitable younger sister for the 30-year-old Leonetti Cellar brand — biodiversity is one of those reasons. Both wines are crafted by Chris.

One might think it odd that grapes or vines are not shown on the label. However, that imagery can be associated with all wines and this brand deserved to be unique and tell part of the family story. The fig also helps establish fluency between the image and the name, making it more memorable.

Natural brand extensions

Chris wanted to test his sustainable, estate winegrowing philosophies and apply them to growing and producing food of world-class quality, sustainability, and pedigree. The first of these new companies, located in the Lostine valley of Oregon between Mount Joseph and the Blue Mountains, is Lostine Cattle Company. Rich fertile soil supports excellent grazing crops for

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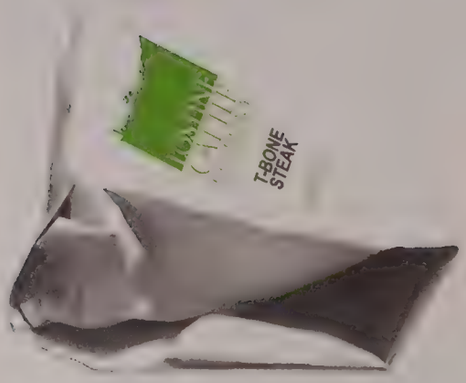

the Scottish Highland cattle that Figgins Family Wine Estates raises there. The views are stunning, and provide the imagery for this company's logos and website.

The sustainable, hormone- and antibiotic-free, all natural 100% grass-fed beef will be offered direct to customers beginning in January 2011. To emphasize the company's sustainable goals, the printed logo is ponderosa pine green and, when used as a closure sticker, stands in stark contrast to the white biodegradable, recyclable, and compostable butcher paper that covers each cut of fresh meat.

The meat is shipped in a sustainable cooler. Customers can order a reusable, lined fabric cooler with their meat order that can be returned and reused to ship their next order of Lostine beef, or saved for personal use. A second, simplified logo is used on the coolers, where it is stitched into the fabric; the printed detail would be difficult to replicate.

Lostine Cattle Company beef is "designed" to pair perfectly with Figgins Family wines — it is — the perfect symbiosis of food and drink. When you taste this beef you will become a believer in the company's "TRUE. FREE. RANGE."™ trademark.

The web goes mobile

All of the Figgins Family companies have websites designed to inform, educate, and attract club members while

offering stunning visuals. The sites are also designed to make purchasing of their products easy with fully integrated e-commerce sections. Wine and food products sold direct have the ability to create a more intimate relationship with the customer, improve the value-to-price ratio, and return higher profits to the companies.

As consumers access the web more and more via their mobile devices, Boxwood's designers have changed their thinking about the web and have been modeling their designs with both mobile phones and computers in mind.

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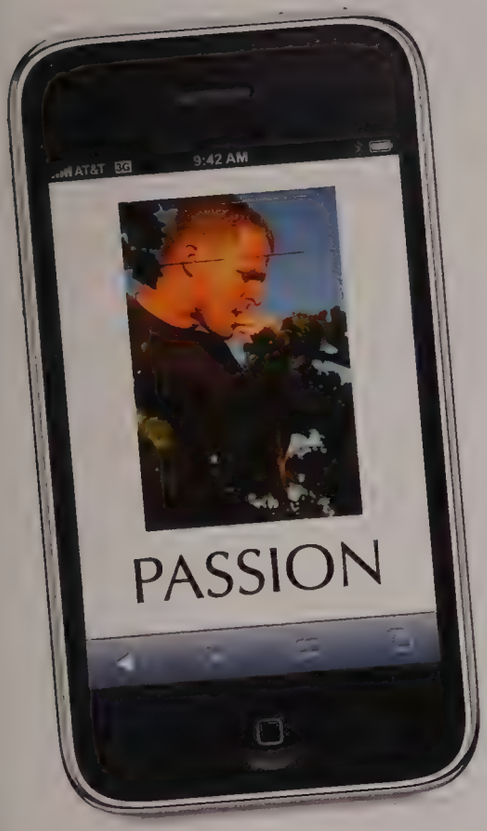

To that end, two of the three Figgins Family websites have mobile counterparts that allow the browser to access pertinent information, order, and join the club with their mobile phones. Touch icons have been created for the iPhone so that visitors can bookmark the sites. Currently this involves creating two separate programs because of bandwidth restrictions on mobile devices; however, as technology continues to evolve, these two mediums may merge into one.

Tell a story

Chris has a lot of ideas brewing and has gathered around him a team of professionals to help him realize his dreams. He is forward-thinking, but gathers his strength from his heritage. Each of the family's new ventures will reflect a strong sense of place, and the products will be molded by their terroir.

The brands have been designed to reinforce these ideals, to connect directly with customers and tell a story. Everyone likes a story, don't they? When we hear it for the first time we connect to the storyteller in a new way. We begin to see ourselves in the storyline — and when we have tasted that exceptional Cabernet Sauvignon or eaten a mouthwatering ribeye ourselves, we will retell it with personal passion and experience. It will become our story, too. ■

About the Author

Joe Chauncey is one of three principals at Boxwood (Seattle, WA), an integrated design studio providing holistic, comprehensive and sustainable design solutions spanning the disciplines of planning, architecture, branding, graphic design, and web design services. Boxwood received American Graphic Design Awards in 2010 for the Figgins Family brand and the Figgins Package. Information about the firm can be found at www.eboxwood.com.

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BANKNOTE WINE COMPANY brand strategy delivers HAND-CRAFTED shelf appeal

BY PWV Journal Staff

Although the number of U.S. wine brands is estimated at around 7,000, the wine industry statistical research firm Gomberg, Fredrikson & Associates tracks more than 15,000 wine SKUs. In a marketplace of stiff competition on the retail shelf, Pete Nixon, Banknote Wine proprietor (Napa Valley, CA), knew the importance of having a first-rate label when launching his brand, The Vault Napa Valley, a red blend of Zinfandel, Syrah, and Cabernet Sauvignon, in 2007.

A limited-production, hand-crafted wine produced by means of small-lot bottling, the majority of The Vault wine is shipped and sold to wine shops in New York, New Jersey, and Florida, with a small percentage available in approximately 50 restaurants in eight states. The wine is also available for purchase online.

Positioned as a premium brand, Nixon wanted a multi-faceted, eye-catching label that would essentially ensure new consumers would be drawn first to his wine at retail.

"I needed an unusual, prominent package design that would complement the distinctive Napa Valley red blend," says Nixon. "It was vital that the labels not only be different from what the competition was doing, but the labels also had to express the quality of the wine itself. I believe anything that sets you apart from the crowd, if done correctly, is an advantage in any retail environment."

A graphic designer by trade, with extensive knowledge of the wine industry, Nixon created 12 graphically complex banknote-theme labels for his wine. Unable to select one banknote design, he elected to use all 12. As a result, each bottle in a case of The Vault has a different label.

Nixon designed a two-piece label. The main banknote on top prominently carries the Banknote Wine Company name, while a strip label at the bottom identifies the brand and bottle serial number. Each banknote design is a reproduction of an actual banknote, and showcases intricate detail and craftsmanship of the engravings.

Due to the small volume (1,500 cases) and multiple-label concept, and to ensure the fine details of the banknote designs were reproduced to the highest quality, Nixon chose digital offset to print the labels.

Banknote Wine labels are printed on an HP Indigo ws4050 press with a 230 lpi line screen, and printed four-color process with an additional black layer in the solid areas. The labels are embossed and foil stamped with two foils — black and gold — on an Iwasaki off-line finishing press.

"Digital offset printing is the only way to print multiple labels, because of the ability to sequentially position each of the 12 images on the same roll," Nixon says. "Each bottle label of Banknote Wine is individually numbered. The entire process allows a case of wine to be automatically packed on-line with 12 different label images."

Banknote Wine labels were printed by Tapp Technologies, Inc. (Napa,

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CA.), a pressure-sensitive label printer with 18 years of experience in the wine industry. Nixon, a previous Tapp Technologies employee, knew firsthand the level of quality the converter was capable of providing, and knew his label concept would be brought to life and executed to its fullest potential.

Digital printing proved to be the most cost-effective way to produce the Banknote Wine labels, as it eliminates the costly and time-consuming pre-press process required by offset printing. It also helped maximize overall production by avoiding extra labor costs that would have been necessary to hand-sort and box the wine.

"When Pete approached us with his label vision and goal of producing labels to support his brand strategy, we suggested Avery Dennison's Fasson® digital pressure-sensitive label papers," says Travis Pollard, digital business manager for Tapp Technologies.

Widely used in the wine industry, Fasson Estate Label® No. 8 is a bright white, uncoated vellum stock that combines a rough, porous surface with a rich textile feel. S100R permanent emulsion acrylic adhesive (made by Avery Dennison), was specified for label application onto the bottles.

The label material was paired with Fasson's poly-coated natural kraft liner, which has excellent durability when embossing and foil stamping, minimizing downtime.

"By matching the right substrate material to the printing technology, we were able to maximize the inherent strengths of both the material and the printing method," Pollard says. "It offers the best opportunity for bringing a label design to fruition."

"Purchasing digitally-ready material saves product time, in that we do not have to topcoat the material before printing," Pollard adds. "The coating process is typically done on a finishing press, which is used to die-cut and print labels. However, by buying pre-coated material, we can continue to use our finishing press to convert labels and free-up production capacity. There are no uncertainties about the possibility of having to rework a job.

In the case of Banknote Wine, with a limited production run of approximately 1,500 cases of wine annually, digital printing is ideal. It allows for short runs with less overall material costs. To set up labeling of the bottles, on average, less than 100 feet of stock is required, whereas traditional methods may run through as much as 1,000 feet of stock.

While the printing process is relatively seamless, Banknote Wine labels have some design elements that require special finishing techniques. To apply the black foil on

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Corneliu Dane, Head Winemaker, Monterey Wine Company

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Shawn Heffernan, Co-Owner/Cellar Master, Boeschen Vineyards

Image courtesy of Stone Pillar Vineyard & Winery

"Good, light-weight design works great with our barrels. I also like the fact that the rack is made out of plastic, instead of steel."
William Layton, Owner/Winemaker, Layton's Chance Vineyard & Winery

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top of the gold foil requires printing finesse – trapping one foil with the other to compensate for any registration problems. In addition, Tapp Technologies had to keep the colors of each of the 12 labels consistent with those of the previous vintage.

"The digital printing process does an admirable job of capturing consistent label quality and color by producing smooth and consistent screen gradations," Pollard adds.

"Creating 12 different labels for just one wine, each with its own design, helps distinguish the Banknote brand on the shelf," says Nixon. "The multiple label concept has never been done before to this extent that I am aware of. The intricate details and engravings on the different labels make the brand memorable and more likely to grab consumers' attention. Also, by numbering each bottle, consumers are informed of the overall case production of the bottling run.

"I have only received positive feedback. I have the greatest customers who email just to let me know how much they love the wine and the labels."

While Nixon sees the contents and the label together, Pollard's vision is keenly fixed on the package. "The label is ultimately what will sell the wine," explains Pollard. "Having a wine label that is unique and printed with fine quality differentiates the brand in the marketplace. And that ultimately drives growth of the brand." ■

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CLEAR CHOICE AWARD WINNERS

ECO-FRIENDLY VALUE BRANDS

BY Tina Vierra

Screen printing on wine bottles continues to be a successful packaging choice for premium wines, but it is also finding success on lighter weight bottles and with value brands. The Tentacle package from Eight Arms Cellars (Berkeley, CA) won a 2010 Clear Choice award from the Glass Packaging Institute for its compelling design and eco-friendly packaging. Down Under by Crane Lake won a 2009 Clear Choice Award for Bronco Wine Company (Ceres, CA).

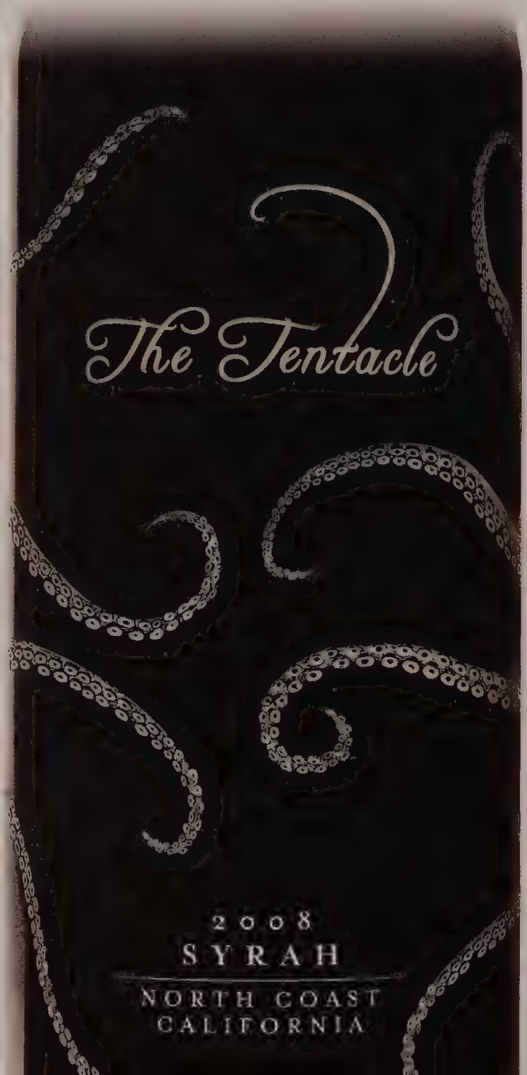
The Tentacle from Eight Arms Cellars

Eight Arms Cellars started small, selling 650 cases in its first release in 2010, and hopes to double production to more than 1,300 cases in 2011. When owner/winemaker Iain Boltin decided to make a high-quality, good value Syrah ($12) and call it The Tentacle, he called on package designer John Schall.

"Iain had bought a lovely antique illustration of an octopus, which was the basis for his Eight Arms logo. We re-illustrated and expanded the octopus to create The Tentacle," Schall explains.

Screen printing was the ideal choice for this package, since the octopus design wraps around the bottle completely. Schall's design and Boltin's choice of glass combined for an economical package. The bottles are Verallia's ECO Series™ lightweight glass (the "tapered claret" mold weighs just 454 grams), and the screen print uses just one ink color (pale cream).

"The lightweight ECO Series glass actually does not introduce any challenges into our regular printing process, specifically because Verallia's ECO Series bottles are very high quality," says James Jordan of Monvera Glass Décor (Emeryville, CA), the company that decorated the bottles. "We print on ECO Series



bottles for a number of our clients — and multiple color prints are not a problem on lightweight glass of this quality. The glass choice for screen printing affects oven temperature, annealing curves, and overall run speeds. Selecting quality glass is very important.

"The package succeeds because John Schall put great consideration into the design space. He came up with a beautiful one-color, full wrap label that actually utilizes the unprinted surface of the ECO Series bottles as a design element. Details, like the eyes of the octopus and the suckers lining each tentacle, are defined in large part by the dark glass showing through the spaces in the ink. When creating a label for screen printing, it is always best to consider how the surface of the glass itself can become a part of the design. It is the economical approach to achieving a two-color look with a one-color label."

Schall located the arms of the octopus very carefully as they wrap around the bottle. Positioning bottles of The Tentacle side-by-side results in an unbroken line of octopi whose tentacles meet each other precisely — a neat effect for shelf displays.

Additionally, because the decoration wraps all the way around the bottle, it compels a consumer to pick up the bottle to see what is on the other side.

Happy with the success of The Tentacle (which sold out in its first release), Boltin bottled 120 cases of new wine in another octopus-inspired screen printed package in April 2011. The Argonaut (an octopus with a shell) 2010 Sauvignon Blanc was released in June 2011.

Bottling in screen printed glass

Mikel Olsten from Castoro Bottling (Paso Robles, CA) reports that screen printed bottles perform well on bottling lines. "There is no labeling to do, of course," he says, "but there is no measurable increase in bottling line speed. The line is only as fast as the slowest operating machine, which is typically in the corking and capsuling."

Screen printed bottles enter the Castoro bottling line with the same precautions as bottles to be labeled — they are sparged with compressed air and then nitrogen before filling. Any particulates or carton dust that may have entered during decoration or case-packing should be removed by this process.

Randy Ramos of Top-it-Off Bottling (Sonoma, CA) bottles Eight Arms Cellars wines at a crush facility in Fairfield, CA. "We handle a lot of screen printed packages," Ramos reports. "For the most part, they perform just as fast and easily as bottles that receive labels on our lines.

"There are a few tricky packages out there, such as wineries who choose to screen print a general brand on the front of their bottles, and then apply

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differing paper labels on the back for different wines or vintages."

Down Under brand packaging

Eco-friendly packaging won a 2009 Clear Choice Award from the Glass Packaging Institute for Bronco Wine Company's Down Under by Crane Lake wine brand, launched in June 2009 in the U.S. wine market. According to Bronco chief executive Fred Franzia, the company set out to make and market a good Australian wine at a great price, competing with other Australian imports such as [yellow tail]. Bringing the wine up from Australia in tankers to blend, finish, and bottle in Bronco's California facility gave the company complete control over the quality of the wine, brand packaging, and pricing.

What earned the Glass Packaging Institute's Clear Choice Award is the "green" packaging. Down Under is bottled in Verallia's 10.5-ounce Revolution cork-finish bottle, the lightest available in North America, and part of the glass company's ECO Series™. Weighing about 50% less than most wine bottles, the Revolution bottle is made with at least 50% recycled glass, reducing the carbon footprint of the overall package by 25%. The label is printed by WS Packaging on recycled paper.

Thomas Reiss, creative director at Kraftwerk Design (San Luis Obispo, CA), designed the look of the package. "The Bronco team is unique among our many winery clients," explains Reiss, "in that they bring a brand to us with all of the data we need to design it successfully, while giving us a great deal of creative freedom.

"I have worked with large winery clients who box us in a bit more, sending sometimes a 20-page brief on the design. Smaller wineries often have very personal items or ideas we must use: a logo, a piece of art, family initials or a crest. Bronco gives both a full general outline and a lot of room to explore."

Professional brand planning

Reiss met with Kathe Lintemuth (Bronco's New Packaging Production Coordinator) when the Down Under launch began. Given the wine program information (Australian, three varieties), chosen name, destination markets (the brand started with exclusive placement in Trader Joe's stores, and has expanded to other retailers), and price point ($7 suggested retail), Kraftwerk Design then began research on everything from Australian culture and icons, to name meanings, other brand designs, and package element successes, such as the popularity of "critter labels" on Australian wines.

Kraftwerk Design sent several ideas and supporting research back to Lintemuth and her team at Bronco to make the final choices, and Fred Franzia often had input. "Fred is very involved, works very fast, trusts his instincts, and enjoys brand design collaboration," Reiss reports. "He has excellent instincts for what will work. He does not bog down with too much market research, because his knowledge of how to sell successful wine brands is that good."

Bronco wanted the package to clearly convey the wine's Australian origin. Franzia, critical of packaging from other U.S. wine producers that downplays the origin of imported wines, was quoted after the brand's release on this point: "Our package is clearly marked as Australian wine. It is in a claret bottle, not a Chardonnay bottle. We definitely do not want it to sell in place of California wine. We are competing with other Australian wines, not with U.S. wines."

Indicators on the label strongly convey the wine's origins: there is the "Product of Australia" text at top, the name Down Under, and the Koala bear — a recognizable Australian native. Kraftwerk Design and Bronco chose colored label paper to indicate wine varieties, which is another popular Australian practice. The Cabernet Sauvignon is a red label; Shiraz is dark purple; and Chardonnay is pale green.

When initial work by Kraftwerk Design on a new vintage is completed and adopted by Bronco, the winery handles the packaging from there, choosing vendors or producing any peripheral materials (cartons, shelf tags) internally. Vendors are challenged to produce the packaging materials at the lowest possible cost and highest possible quality, and the Bronco team re-shops its packaging materials with each new vintage bottling of a brand.

In its third year in the marketplace (2011), Down Under is no longer part of the Crane Lake brand it started with, but stands alone, with the Crane Lake name removed.

"Bronco has very high quality standards, which might surprise people because of their reputation for producing an inexpensive product," Reiss adds. "But they have very strong quality control when reviewing all packaging elements and design, and bringing a brand to market."

Conclusion

From the use of lightweight glass, to simple yet striking color choices, clear branding, and multi-use bottles with a screen printed front and labeled back, packaging options for wineries continue to expand. The wineries in this report placed emphasis on working with their designers, glass companies, and bottle decorators in tandem, to produce the best possible packaging results at the best prices. ■

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PACKAGING

REDESIGN OF "FLAGSHIP" TIER LABEL
TO REINFORCE PERCEIVED VALUE

BY **Jeremy Trettevik,** 6 West Design, Lodi, CA

Tasked with redesigning the "flagship" Van Ruiten Family Vineyards (Lodi, CA) wine label, which had been virtually unchanged for almost 10 years, 6 West Design's primary goal was to reinforce and elevate the perceived value of nine award-winning wines (more than 70% of Van Ruiten's wine production) in the eyes of consumers. As with any good repositioning/redesign, we tried to retain some key elements that would continue to ring true to the winery's established consumer base.

It was decided to emphasize the "warmth" of the business and the family's long-established history, both as grape growers and more recently as winemakers. We began by looking at any elements that could logically make the transition from the existing label and decided on a two-piece die line and a badge element in the center of the label. After many hours of research and concept exploration we brought the two-piece label together with a simulated wax seal.

The feeling was reinforced by softening the two inside edges with a rough deckled edge, and working from a palette of soothing, rich earth tones. The previous sharply-edged diamond seal was replaced with a much softer printed "wax" seal/badge that was multi-level sculpted-embossed. A soft, script-type font was incorporated into the body to balance some of the stronger serif-branding elements. To add more interest to the overall look, a subtle texture was embossed over the entire label except for the logo type and badge. A foil drop shadow was added to the brand logo type to add a bit more depth and a touch of sparkle to the layout.

As is the case in many label design projects, design is only one component of the process. The other half of the challenge is to translate a beautiful design from a computer screen onto paper. As part of the process, a printer's mechanical is created that specifies each detail of the printing process, foil, embossing, and colors that will yield the best result.

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Multiple reference files were created for the embossing toolmaker to use as a guide when creating the sculpted embossing of the "wax" seal/badge.

Estate #8 paper was chosen for its presence on the bottle, light texture, and printability. Some texture could be added after printing with embossing. The biggest challenge was for the printer to achieve the die cut.

The best indicator of a redesign job

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Van Ruiten Vineyards 2001 Syrah label (42% of actual size).

well done is when there is a marked increase in sales. "We have experienced very strong sales growth since introduction of the new flagship label," reports Audrey Zunino, Van Ruiten marketing manager.

Label redesign is rarely an easy or inexpensive process, but when applied to brands that are delivering well in cost/value, with pent-up consumer demand and a good route to market, the results can be explosive and very rewarding.

New labeler offers useful features

The Mercure III pressure-sensitive labeler is part of a new bottling line from Costral Bottling Technology installed at Van Ruiten Family Vineyards that can apply labels and capsules at a maximum speed of 3,000 bottles per hour.

Features of the labeler include:

Easy-to-use touch-screen control panel that can retain each label/bottle configuration for quick set-up and easy changeover. Four independently controlled label stations with integrated electrical controls. Easy set-up for reverse taper bottles. On demand splicing for continual operation with label sets (Front + Back on same roll). Ultra-sound sensors for use with clear labels or clear backing. Optical orientation to align labels with printed capsules or overlabeling of existing labels.

The cap dispenser has: a cork-absence detector to prevent capsule or label application, a large capacity capsule magazine, controlled centering of the bottle neck for reliable cap application, plus integrated

New labeler at Van Ruiten Family Vineyards (right) and monobloc (left).

electronic control to adjust capsule length (28 to 36 mm).

The capping/spinner has rotary, dual capping heads for tin, polylam, or aluminum capsules with eight multi-material rollers on bearings. There is electrical and simultaneous adjustment of the cap dispenser and capping heads. PVC capsules can be applied with quick interchangeable and easily adjustable heat-shrinking heads.

The GALAXY **3in1 Monobloc** has synchronized encoders so the bottle path is tracked from when it enters the equipment at the infeed screw. The sterilizing rinser/sparger inverts bottles with a long, dry cycle (30-40 seconds) after a rinse of sanitary solution (liquid is recycled), fol-

lowed by a complete water rinse, and finished with inert gas is injected/sparged at last station prior to filling of bottle with wine.

The 16-valve filler has a closed-valve air command system (3-position patented valve). Leveling is done at the filler head (not secondary station) with no need for secondary gas injector (source of contamination). When there is no bottle on the pedestal, there is no vacuum, contamination, nor air back to the filler bowl. There are no dynamic joints in the filler head (only wine is in contact with stainless steel). Rubber gaskets are replaced infrequently and inexpensively. Wash up is the same as wine flow with a sanitation CIP tray.

Low spring pressure per head prevents bent pedestals and bent valves. There is a float level in the filler bowl that provides warning, prior to running out of wine. An integrated variable frequency drive controls the wine pump. The wine level and fill height are adjustable while the equipment is operating.

The single-head corker was designed and built for 500 lbs of torque. Only one column is needed for screw cap or cork. The corker plunger speed is adjustable. The stainless steel corker jaws have easy access for cleaning and inspection.

"The Costral Bottling Technology equipment is operating very well," reports Ryan Leeman, winemaker at Van Ruiten Winery. "We are utilizing the complete line including the parasitic sterilizing, rinsing, and nitrogen-sparging of bottles prior to filling and corking or screw capping. The labeler is very operator-friendly with fast set-ups with effective automatic capping. Van Ruiten Winery utilizes both very complex and standard labels. As with all equipment, there is a definite learning curve, and BucherVaslin North America has been very good to work with. We continue to improve our operating efficiencies and bottling rates. All in all, we are very satisfied with our selection of Costral bottling equipment and the advanced features they provide." ■

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PACKAGING

Influence of BACK LABEL TEXT ON WINE CHOICE

BY Simone Mueller, Larry Lockshin, Jason Blanford, Ehrenberg-Bass Institute for Marketing Science, University of South Australia

Consumers are presented with a vast array of products and product attributes to consider when making a wine purchase decision — thousands of brand names, dozens of grape varieties, regions, labels, wine styles, and a large range of prices to choose from.

Not only are consumers faced with myriad choices, but each purchase is also associated with a perception of risk, which often leads them to approach the purchase with a degree of fear, insecurity, skepticism, and caution. This insecurity is increased if the wine is being bought for a special occasion, such as a gift or a festive social dinner.

Consumers seek to examine a wine's attributes as part of a risk reduction strategy. Some of a wine's attributes, such as quality or sensory characteristics like taste, can only be assessed during consumption. Other attributes, such as brand name, awards, production procedures, and cellaring advice, may be found on a wine's front or back label and may assist consumers in evaluating the wine prior to purchase.

Front labels convey (with some exceptions) the most essential and legally required information about the product: the winery's name, grape variety, grape origin, vintage year, and alcohol content. The back label often describes sensory characteristics of the wine, winemaker's notes, and compatible foods for the specific wine style.

A wine's front and back label are the most cost-effective form of marketing promotion, and a way for wine producers to communicate directly with customers at the point of sale. It is, therefore, surprising that so little research has been conducted on what statements on the back label have the most influence on consumer purchasing.

The few studies conducted have shown that more than 50% of consumers read back labels and find them important in their selection.[1] Existing research on back label content is limited mainly to small studies of narrow sets of attributes.

Ten years ago, the *Australia & New Zealand Wine Industry Journal* published a study showing that different back label statements created different perceptions of a wine's quality.[5] Beyond these, the other studies only investigated one or two attributes, usually in the context of front and back labels. None of these studies were able to quantify the importance of different types of back label statements or test them against a consumer's actual wine choice, especially with different prices.

Method

We developed an experiment to test 10 different back label statements in an incomplete block design along with four different prices. A sample of 331 wine consumers was recruited in May 2008 for a wine tasting research project in North Sydney, and were given the back label experiment as a part of this project. The sociodemographics of the sample were similar to those of the general Australian wine consumer population, when compared with the Roy Morgan single-source data of over 50,000 Australian consumers.

The respondents were given a range of socio-demographic and wine consumption questions along with the experiment. They were asked to consider purchasing a wine for a special occasion, which represents approximately 25% of the purchase occasions in Australia,[2] and given a printed page with four different back labels and prices for a Shiraz wine.

The statements were taken from previous research and from common back label text. We added one on ingredients, since this is under consideration in both Australia and the U.S.

Each back label had between 2 and 10 statements. Respondents chose

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Table I: Statements and prices tested

Attribute	Actual statement or price used on the label
History	Family-owned for 75 years using our time-honored methods to ensure unparalleled quality.
Grape Source	All grapes sourced locally.
Production	Matured in French oak barrels for 12 months prior to bottling.
Simple Taste	A full-bodied, red wine.
Elaborate Taste	Displaying elements of dark chocolate, ripe plums, and fine chalky tannins.
Food Pairing	Match with red meat, poultry dishes, and good Indian curries.
Consumption Advice	Drink now, or with careful cellaring, enjoy in five to six years.
Environmental	This environmentally-conscious wine was produced using biodynamic techniques.
Website	For more information please visit www.barossawines.com.au
Ingredients	Grapes, sulphur dioxide, yeast, diammonium phosphate, bentonite, pectinolytic enzymes
Price	$13.99, $19.99, $25.99, $31.99

the wine they would be most likely to buy from 16 different sets of four labels, which allowed us to compute the effect of each of the statements and price on the probability of choice. Respondents were asked, "Would you really purchase your choice?" to test the realism of the experiment. Eighty-seven percent said they would buy their choice.

Results

A latent class choice model was used to simultaneously create clusters and utilities for each statement in each cluster. The best solution had the 331 respondents grouped into five different clusters, with strong differences in the importance of each of the statements and price across the clusters (Table II). The final column in Table II shows the average value for the sample.

Overall, price accounts for 66% of the importance, with the back label attributes accounting for the remaining 34%. Listing the "ingredients" had the highest value — though with a negative influence on predicted choice — followed by history, food pairing, and the elaborate (or longer version) description of the wine's taste.

The clusters differ substantially in the importance of price and back label statements. Ordered from 1 to 5, the clusters with lower numbers preferred lower prices and those with

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higher numbers preferred medium and higher prices.

In two clusters, price is dominant (C1 — low price and C3 — medium price). In other clusters, the back label statements have a larger effect. Perhaps the most interesting is C5, where ingredient labeling has a very large negative effect on the probability of purchase. The advent of ingredient labeling would certainly affect people in this cluster.

The lowest price C1 cluster (which is about 31% of the sample), values food pairing and not much else. The C2 cluster prefers wines at either $13.99 or $19.99 and strongly values information on winery history, production methods, and both simple and elaborate taste descriptions. C3 prefers prices around $19.99 and is influenced somewhat by simple taste descriptions and food pairing. Consumers in C4 choose prices around $25.99 for a gift or special occasion and value elaborate taste descriptions and history, but are negatively influenced by ingredient labeling.

Overall, those clusters for which price is the predominant and almost only choice-driver represent about half of the population (C1 and C3). About one-third of frequent Australian wine consumers (C2 and C4) can be positively influenced by back label information, especially history and elaborate taste descriptions. About one-third of frequent Australian wine consumers are adversely affected by stating ingredients on the back label, with a small share (about 13%) of consumers (C5) refusing to choose labels including them.

Each cluster was compared on a range of demographic (age, gender, income) and wine consumption behavior and attitudes, but no major differences were found between the groups — an interesting and very important result.

Typical marketing and wine marketing professionals have been using demographics and other easy-to-measure variables to segment potential consumers for their products.

We have now been using "choice" experiments for more than six years, and continue to find that demo-

Table II: Importance of attributes for each of the five segments and overall (in percent)

	C1	C2	C3	C4	C5	Total Sample
Segment Size	31%	18%	20%	18%	13%	N=331
Price	88.1	31.3	80.1	69.4	33.2	65.9
Ingredients	–0.6	–1.9	–0.2	–4.3	–59.0	–9.0
History	0.1	18.1	1.8	6.4	0.0	4.8
Elaborate Taste	2.4	7.9	0.0	8.9	0.3	3.8
Food Pairing	6.1	1.6	4.7	0.8	2.8	3.7
Production	0.3	10.8	3.9	1.7	0.0	3.1
Grape Source	1.1	6.7	2.2	2.0	1.4	2.5
Environmental	0.5	9.0	0.6	1.5	1.8	2.4
Simple Taste	0.2	6.0	5.3	0.2	0.1	2.3
Consumption Advice	0.5	6.6	1.0	3.3	0.1	2.1
Website	0.0	0.1	0.1	1.5	1.2	0.5

graphics and attitudes do not predict how consumers choose wine. Consumers definitely use different strategies to make wine choices, and our experimental results have strong correlations with actual sales in the market, so we believe wine marketers need to reconsider how they segment consumers.

As a result of this finding, producers cannot specifically target the five consumer segments by supplying different products to different sales channels. However, this study outlines certain combinations of wine attributes that are valued by certain consumer groups.

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For example, lower-priced wines should display information on food pairing and elaborate taste descriptions, which are of high utility for about one-third of consumers (C1). A smaller share of about one-fifth of consumers who value environmental back label attributes like to read history and production method information and elaborate taste descriptions (C2).

Wines sold at medium and higher price points are recommended to display food pairing, elaborate taste descriptions, and winery history information on back labels (C3 and C4). All of these additions had positive impacts on choice probabilities.

The low importance of an environmental message agrees with findings by H. Remaud et al., who found that only 15% of Australian wine consumers consider environmental claims when making a wine purchase decision.[4] In this study, it only has a notable impact for one consumer cluster (C2).

While almost all information on back labels had a positive impact on consumer choice, ingredient information had a strong negative effect for about one-third of frequent Australian wine consumers.

For a small segment (13%), the negative impact on choice of 59% implies that a very positive attribute such as a very low price would have to compensate for the substantive negative reaction to ingredient information. This strong aversion to the list of ingredients was surprising, and cannot be explained completely by this study. It is possible that the mention of complex and unfamiliar ingredients creates a stronger feeling of risk or perhaps is inconsistent with the overall image of wine as natural and healthy.

These findings have important implications for a government consid-

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ering compulsory labeling of wine ingredients as recently supported by Australia's leading consumer organization, "Choice."[3] The government has to ensure that consumers are educated and informed about the meaning, risk, and potential health impact of those ingredients and needs to find terms and language understandable to buyers. Otherwise, these information measures are likely to have an adverse impact by creating risk perceptions instead of reducing consumer uncertainty.

Conclusions

This study is preliminary and used only back labels and price. We know about one-half of consumers mainly use front labels in their wine choice decision, so these findings must be combined with a good understanding of front labels to be effective. We did find that, except for ingredient labeling, these back label statements had either a positive or no effect, so using these results to fine-tune a back label is recommended.

We were unable to measure the interactions of different back label statements over the total consumer sample. Some combinations of statements had a stronger effect for some clusters than for others. Back label statements are an inexpensive and efficient means for small- and medium-size wineries to interact with consumers, and more attention should be paid to what is actually printed on the back label. ■

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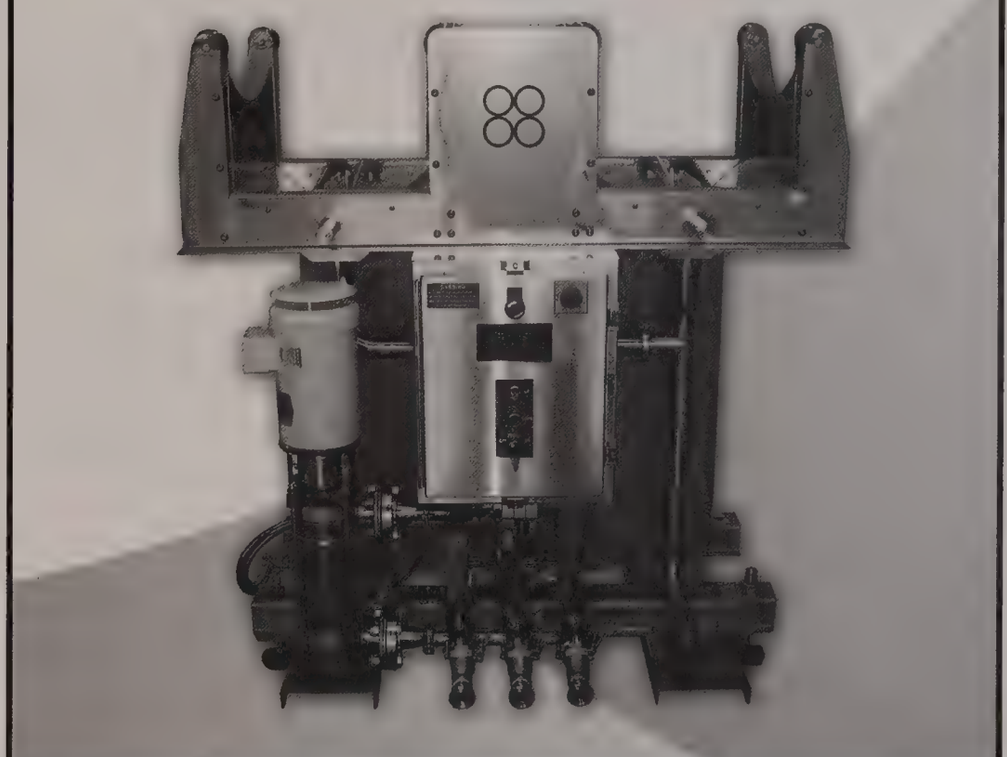

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A wide call for abstracts across verbal, workshop and poster presentations has been made and will comprise the remainder of the formal conference proceedings.

The conference will explore four themes: cool climate viticulture, enology, sparkling wine, and marketing. Jancis Robinson's keynote opening address will be: "What's hot about cool climate?" and her closing presentation will consider: "Marketing the cool climate story."

The 8th ICCS is jointly presented by Wine Tasmania, the Australian Wine Research Institute and the Tasmanian Institute of Agricultural Research. Andrew Hood, Chair of the 8th ICCS Planning Committee, says: "The conference will be one of the defining moments in the Tasmanian and Australian wine industry and offer insights into new research to a global community contending with the effects of climate change."

CONFIRMED SPEAKERS

The 8th ICCS Planning Committee, chaired by Andrew Hood, announces the following confirmed speakers:

- Stan Beurskens, flying Dutch winemaker, researcher, consultant, Beurskens Viticulture Consultancy (The Netherlands)

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- Pierre-Yves Boumérias, OEnologue and Winemaker, Institut Oenology de Champagne (France)
- Michael Brajkovich, Kumeu River Wines (New Zealand)
- Ross Brown, former CEO of Brown Brothers and Chair of Australia's First Families of Wine (Australia)
- Dr. Peter Dry, former academic and consultant to Australian Wine Research Institute (Australia)
- Karl Forsyth, Senior Engineer, Australian Wine Research Institute (Australia)
- Dr. Andrew Pirie, winemaker, (Tasmania, Australia)
- Dr. Andy Reynolds, Research Chair in Viticulture at Cool Climate Oenology Institute, Brock University (Canada)
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Tasmania is also famous for the quality of its foods, wines and beers, including seafood, temperate fruits and vegetables, grass-fed beef and lamb and cheeses. Although the Tasmania wine sector is small, it is very highly regarded for the quality of wines produced, including sparkling wines, Pinot Noir, Riesling, and Chardonnay.

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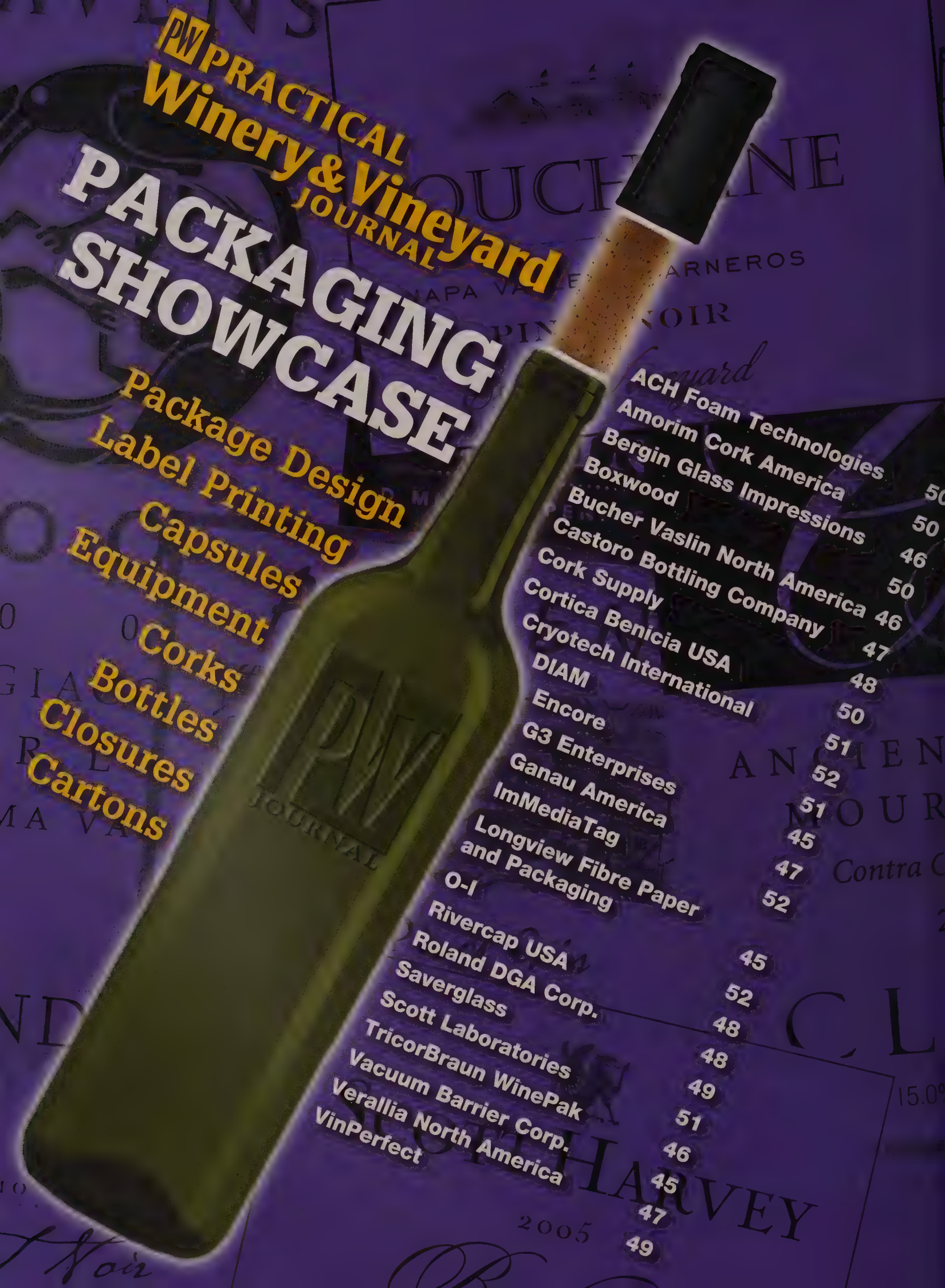

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G3 Enterprises

G3 Enterprises is a leading packaging manufacturer and logistics service provider with generations of experience in the wine industry, total solutions, and exclusive products and services in the following areas:

Custom Label Printing: G3 provides full service capabilities and options from customized pressure-sensitive or cut and stack labels, to bottle etching and decorating.

Custom and Stock Closures: G3 offers an extensive selection of traditional and alternative closures, including aluminum screw caps, DIAM® corks, VinoTop corks, capsules, champagne stoppers, bar tops, and crowns.

Transportation: G3's logistics team transports raw materials and finished goods domestically and internationally. G3 transfers grapes to crush facilities, transports bulk commodities, manages imports and exports, and moves products via boxcar, intermodal, and truck.

Warehousing: G3 has more than 3 million square feet of warehouse space in California's Central Valley, Chicago, and warehouse partnerships in Pennsylvania, Georgia, Florida, Texas, Kansas, New Jersey, and the United Kingdom.

Mobile Bottling: G3's bottling lines include the first mobile bag-in-box, and an alternative packaging line capable of bottling PET, flat panel, and aluminum bottles.

Winery Services: Services and products offered include wine sourcing, label printing, wine closures, glass and cartons, and bottling services.

For more information, contact:
G3 Enterprises
502 East Whitmore Ave, Modesto, CA 95358
tel: 800/321-8747
e-mail: g3.info@g3enterprises.com
website: www.g3enterprises.com

Longview Fibre Paper and Packaging

Longview Fibre Paper and Packaging has been providing excellent corrugated products to winery customers since 1950. With seven strategically located plants in California and the Northwest, Longview is a full-service, custom corrugated manufacturer.

Longview™

TRUE CRAFT™

With expert emphasis in wine industry packaging, Longview's manufacturing capabilities represent the latest in corrugating and converting technologies. Plants specialize in:

- Value-added high quality graphics;
- Up to six color direct print capabilities;
- Four color process print with aqueous or UV coating;
- Litho-lamination and Litho-label;
- Solid fibre slip sheets;
- Eco-friendly, sustainable kraft boxes;

Environmentally-friendly inks.

Whatever branding efforts a winery develops, the Longview design department can assist with all structural and graphic needs, developing an impactful look from each design. *A wine shipper is a moving billboard – do not leave such an important piece of branding to chance.* Call Longview direct, or ask the glass supplier to use Longview Fibre Paper and Packaging.

For more information, contact:
Longview Fibre Paper and Packaging
8511 Blaine St, Oakland, CA 94621
tel: 510/569-2616; fax: 707/736-7003
e-mail: wine@longfibre.com
website: longviewfibre.com

PLEASE SEE LONGVIEW FIBRE AD, PAGE 22.

Vacuum Barrier Corporation

Vacuum Barrier's line of Nitrodose liquid nitrogen injection systems provide a drop of rapidly-expanding liquid nitrogen, allowing winemakers to keep the dissolved oxygen level to a minimum. Whether the winery practices pre-fill inerting or headspace conditioning, oxygen levels are greatly reduced to provide a longer shelf life for wines.

The extreme precision allows packages to receive the correct dose at any line speed. High-efficiency vacuum insulation dramatically reduces liquid nitrogen consumption. The clean, hygienic design and hands-free CIP protection is ideal for high-pressure water, or chemical clean-up in sensitive filling areas.

Vacuum Barrier's Nitrodose Easy Dose System offers:

- Low-cost liquid nitrogen injection for all package types;
- Simple installation, operation, and start up to pressurize or inert a variety of packages;
- Sealed and dynamic systems available;
- PLC controlled with selectable language;
- No container/no dose capability;
- 3-D (directional dose dispersion) technology for special applications.

Additional options are available to best serve winery special requirements.

For more information, contact:
Vacuum Barrier Corporation
Edward Hanlon, VP Worldwide Sales
4 Barten Ln., Woburn, MA 01801
tel: 781/933-3570; fax: 781/932-9428
e-mail: sales@vacuumbarrier.com
website: www.vacuumbarrier.com

PLEASE SEE VACUUM BARRIER AD, PAGE 5.

TricorBraun WinePak

TricorBraun WinePak is synonymous with options, including the ECO Series™ of wine bottles from Verallia (TricorBraun is a preferred supplier for Verallia), a smart move towards sustainability.

TRICORBRAUN winepak

Many styles of capsules from Amcor (Alcan) are available, as well as popular Bag-in-Box, for which TricorBraun WinePak can supply world class bags, spouts, and boxes, along with rental equipment for filling.

TricorBraun WinePak has in-stock options for multiple styles of both imported and domestically-sourced bottles.

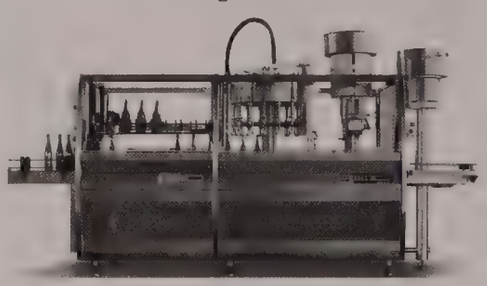
TricorBraun WinePak continues to provide wineries with the quality options to make wines the best they can be. TricorBraun has offices in Canada, Washington, Oregon, and California.

For more information, contact:
TricorBraun WinePak
603 Indiana St., Benicia, CA 94510
tel: 707/747-1055; fax: 707/747-1064
e-mail: abottene@tricorbraunwinepak.com
TricorBraun Oregon
2622 North Marine Dr, Portland, 0R 97217
tel: 503/221-9990; toll free: 800/525-4981
fax: 503/221-9977
TricorBraun Washington
22615 83rd Ave S, Kent, WA 98032
tel: 253/872-0858; fax: 253/872-4575
TricorBraun Vancouver
1650 Brigantine Dr, Unit 500,
Coquitlam, BC V3K 7B5
tel: 604/540-8166; fax: 604/540-8160
TricorBraun Toronto
7050 Woodbine Ave, Ste 203,
Markham, 0ntario L3R 4G8
tel: 416/213-7474; fax: 416/213-7469
website: www.tricorbraunwinepak.com

PLEASE SEE TRICORBRAUN WINEPAK AD, PAGE 2.

Bucher Vaslin North America (BVNA),

BVNA offers **Costral Bottling Technology** as part of its wide selection of high-quality winery equipment. As a subsidiary of Bucher Vaslin, BVNA can quickly respond to winery needs with new technologies and innovation. BVNA's exclusive distributor agreement with Costral serves the unique bottling and labeling needs of small, medium, and large wineries.



Costral's advanced bottling technology includes monobloc designs with various configurations, including rinsers, fillers, corkers, and labelers. Costral's patented filler system provides automatic bottle and fill height leveling, and can include a CIP option for automated sanitation. The Costral filler system has no springs or joints – ensuring sanitary conditions, easy cleaning, and long-wearing component parts.

Costral's multi-head corker units accommodate traditional cork, screw caps, crown cap, or bar tops with its revolving column design with a five-minute change-over. Rinsers offer complete rinsing, bottle sterilization, and inert gas insertion prior to filling.

BVNA maintains commonly used parts in stock. With Costral Bottling Technology, BVNA continues to provide locally accessible, full service on all equipment represented throughout North America.

To learn more about Costral Bottling Technology products, and receive an expert consultation and quote, please call BVNA or visit the website to find a local sales representative.

For more information, contact:
BVNA, Inc.
350 Morris St., Ste. E, Sebastopol, CA 94572
tel: 707/823-2883; fax: 707/823-6954
email: sales@buchervaslin.com
website: www.bvnorthamerica.com

PLEASE SEE BVNA AD, PAGE 54.

Bergin Glass Impressions

Bergin Glass (BGI) has provided premier glass decorative services to the wine industry since 1988. BGI built its reputation on creating high-end artisan work, beginning with etched and hand-painted wine bottles. This decorating option has been almost exclusively reserved for large format sizes — 1.5L to 27L.

In 1996, BGI added decorative services of direct screen-printing and decal applications. Screen-printed wine labels are produced on one-color, two-color, four color, or six-color machines. Direct-screen printing has grown in popularity as the wine industry becomes more knowledgeable on the merits and benefits of this type of packaging. Direct-screen printing allows designers and wineries to be bolder and more creative in their label design, by allowing more use of the overall bottle surface — front and back.

BERGIN
GLASS IMPRESSIONS

Production managers and winemakers welcome screen-printed bottles, because they do not create disruptions on the bottling line. Labels can never be scuffed, applied crooked, wrinkle, or appear to bubble and fog (think pressure-sensitive).

BGI has added a fully automated six-color print machine to their production line-up, providing more capacity to serve the continued growth of the wine industry.

For more information, contact:
Bergin Glass Impressions, Inc.
2511 Napa Valley Corporate Dr., Ste. 111
Napa, CA 94558
tel: 707/224-0111; fax: 707/224-4185
e-mail: mike@berginglass.com
website: www.berginglass.com

PLEASE SEE BERGIN GLASS AD, PAGE 33.

Castoro Bottling Company

Since 1989, Castoro Bottling has served wineries throughout California with a fleet of high-tech mobile bottling lines. The demand for Castoro Bottling's timely, professional, and knowledgeable service has triggered the bottling of more than 60 million bottles of wine with natural cork, synthetic closures, and screwcaps.

Castoro Bottling offers five technologically-advanced mobile bottling lines that arrive on the winery's schedule to serve all bottling needs. Castoro Bottling can bottle up to 2,500 cases per day, serving any size winery. No job is too small or large. A number of custom services are offered, including labeling and packaging consultation. Recognizing the need for wineries to offer alternative closures, Castoro Bottling has outfitted three bottling lines with screw capping and Zork capability. Castoro Bottling can handle 187ml bottles.

"Our investment in the best equipment and the best people to run that equipment is what sets Castoro Bottling apart," says Niels Udsen. "We anticipate the needs of a winery better than any other bottler simply because I have owned and operated a successful winery for nearly 30 years. Castoro Bottling is a partner who knows and understands your business."

Castoro Bottling Company offers Velcorin dosing, and liquid nitrogen for screw capping. Please call or visit the website.

For more information, contact:
Castoro Bottling Company
Niels Udsen
PO Box 954, Templeton, CA 93465
tel: 805/467-2002; fax: 805/467-2004
e-mail: Niels@castorobottling.com
website: www.castorobottling.com

PLEASE SEE CASTORO BOTTLING AD, PAGE 58.

Ganau America

With total, end-to-end control of the cork production process, Ganau America goes above and beyond standard industry practice at every step, with extra effort to ensure top quality, and take every possible precaution against development of cork taint.

Ganau offers responsiveness, quick turnaround, and close attention to every detail. The dedication to quality and service has earned the loyalty of customers – winemakers who want the best.

In 1995, Ganau introduced TF-technology, the industry's first non-chemical deep-cleaning steam process for natural corks, granules, and discs. It established a new industry best practice that other producers have since worked to emulate.

Ganau is again leading the way with Ganau Revolution™ — another major advance to control cork taint. The Rain Autoclave was designed to purify cork planks with super-heated water droplets and steam. This non-immersion system allows cleaning at higher temperatures (up to 120°C) than other boiling methods. Hotter water means higher pressure to drive purifying steam even deeper within cork lenticels. Use of fresh, pre-heated water for each batch eliminates any risk of cross-contamination (less advanced boiling systems merely filter and recirculate water).

For more information, contact:
Ganau America
21900 Carneros Oak Ln., Sonoma, CA 95476
tel: 800/694-CORK; fax: 707/939-0671
e-mail: mariella@ganauamerica.com
website: www.ganauamerica.com

Verallia North America

As a leading glass container supplier to American wineries, Verallia North America offers a legacy of product innovation, craftsmanship, and customer attention. The company is committed to maintaining this position in the market through forward-looking technologies, and by providing the services customers require. Verallia has focused on both innovation and customer support through two company-wide initiatives, Vision2Sustain℠ and The Vision4Glass℠ Process.

The Vision2Sustain℠ initiative was created in order to facilitate the ongoing development of eco-friendly products and practices. The Vision4Glass℠Process allows designers to be involved in the earliest design phase with customers, to shorten package development time.

Both initiatives have been combined to develop a major improvement in sustainable design and manufacturing – Verallia's ECO Series™. This innovative series of bottles maintains quality and attributes associated with the customer's glass container needs, while reducing the overall impact on the environment. See listing for distributor CaliberWinePak for more details on the ECO Series™ line of wine bottles.

Verallia is proud of its partnerships with America's most accomplished vintners and the role its products have played in the growing worldwide recognition of American wines.

For more information, contact:
Verallia North America
2600 Stanford Ct, Fairfield, CA 94533
tel: 707/437-8717; fax: 707/437-8741
e-mail: marketing@saint-gobain.com
website: www.verallia.com

PLEASE SEE VERALLIA AD, PAGE 31.

RIVERCAP USA

Rivercap USA, a division of Cork Supply, is the exclusive supplier of Rivercap® premium tin, aluminum, poly-lam, and PVC capsules for the North American wine industry.

RIVERCAP

Rivercap premium quality capsules add the perfect finish to a wine bottle. An infinite array of dimensional, color, design, top-emboss, and side-print possibilities makes it easy to customize perfection. Over 500 million bottles per year from thousands of the world's finest wineries depend on Rivercap capsules for consistent quality, performance, and style.

Among many Rivercap "firsts" are the launch of the popular lightweight 80-micron capsule, and the inside/outside super-cleaning capsule system for improved capsule performance.

Other critical Rivercap advantages include:

- a nine-stage deep-drawn shell for an elegant, flawless finish;
- two-color registered side printing;
- high-resolution top embossing;
- high scuff-resistance;
- flexible product dimensions;
- compliance with CONEG heavy metal limits (under 100 ppm).

Rivercap USA offers specialized expertise from an enthusiastic, veteran sales and support team. Rivercap capsules are online at www.corksupply.com. For urgent needs, stock tin, PVC and poly-lam capsules are available from the Northern California inventory.

For more information, contact:
Rivercap USA
531 Stone Road, Benicia, CA 94510
tel: 707/747-3630; fax: 707/746-7471
e-mail: jbell@rivercapusa.com
website: www.corksupply.com

PLEASE SEE RIVERCAP USA AD, PAGE 62.

ROLAND DGA CORP.

Winner of prestigious DPI, EDP, and Label Industry Global awards, Roland's VersaUV line of UV-LED inkjet printer/cutters quickly and easily personalizes bottles and glassware with elegant labels. A complete solution, including Roland VersaWorks RIP software, VersaUV prints on a wide range of media, including very thin films, and then die-cuts wine labels and other graphics into interesting shapes – all on one device through one seamless workflow. The simplicity of the production process makes VersaUV ideal for short runs and even one-offs, which can be produced easily at low cost.

VersaUV goes beyond CMYK and white inks to print clear ink as well, which enables varnishing and embossing effects for a high-end look. Clear ink can be layered to produce both gloss and matte finishes, including 72 ready-to-apply patterns, included with VersaWorks. High-quality, artistic print mode (1440 x 1440 dpi) creates images that rival offset and flexographic print quality.

VersaUV features safe-to-use UV-LED lamps that are energy efficient and require no warm up time. An automated ink circulation system prevents pigments in the white ink from settling, minimizing ink waste and associated costs. For unattended operation, a built-in take-up system is also included. For more information, visit www.rolanddga.com/lec.

For more information, contact:
Roland DGA Corp.
15363 Barranca Pkwy, Irvine, CA 92618
tel: 949/727-2100; fax: 949/727-2112
e-mail: sales@rolanddga.com
website: www.rolanddga.com

PLEASE SEE ROLAND DGA AD, PAGE 3.

CORK SUPPLY

Founded in California in 1981, Cork Supply is a primary supplier of premium natural wine corks in North America. Cork Supply also offers a comprehensive collection of best-in-class top-of-the-bottle products.

From corks to capsules, screw caps to synthetic and sparkling closures, foils, and wire hoods, wineries depend on Cork Supply "for everything from the neck up."

Recognized as wine industry "Top-Of-The-Bottle Experts," the experienced sales, customer service, and technical laboratory professionals at Cork Supply can help select and customize the right finish for each wine.

Top-of-the-Bottle Experts

Cork Supply specializes in a complete line-up of the world's finest performance closures and capsules – all backed by a passionate commitment to quality assurance and customer satisfaction.

The Cork Supply portfolio includes:

- Premium natural corks
- Vapex micro**extra**, micro, and 1+1 corks
- Sparkling corks
- Nomacorc® synthetic closures
- Newpak® screw caps
- Rivercap® tin, aluminum, and poly-lam capsules
- Sparflex® poly-lam and PVC capsules, wire hoods, and sparkling wine foils

Only natural corks from Cork Supply have the added critical advantage of Innocork®, a patented TCA-removal process that delivers ultra-clean, virtually perfect natural corks.

For more information, contact:
Cork Supply
531 Stone Road, Benicia, CA 94510
tel: 707/746-0353; fax: 707/746-7471
e-mail: csu@corksupply.com
website: www.corksupply.com

PLEASE SEE CORK SUPPLY AD, PAGE 66.

VINPERFECT
CONTROLLED-OXYGEN SCREW CAP

VinPerfect has developed a series of high performance screw cap liners that allow minute amounts of oxygen into the wine bottle over time, to assure optimal aging.

As VinPerfect developed the new screw cap liners, staff members were asked: ì*How do you know how much oxygen a wine actually needs?*î The answer: It depends on the wine.

Not a target...BUT, a range.

VinPerfect determined that one ìoptimalî amount of in-bottle oxygen is not realistic. Wine chemistry is far too diverse ó considering all the varietals, vintages, regions, and styles ó to expect a single OTR will suit all wines. However, it is possible to define a range of oxygen rates that might be advantageous to wine quality.

Surprisingly, under this viewpoint, it was clear that no product on the market consistently delivers performance within the range targeted:

Synthetic corks admit too much oxygen.

Screw caps admit too little oxygen.

Natural cork oxygen transmission rates are so inconsistent as to be essentially random.

Selecting post-bottling oxygen performance is a significant evolution for the world of wine. Now, winemakers will have control over the quality of wine after it goes into the bottle, and consumers will experience the wine as the winemaker intended.

A full whitepaper is available online: *www.vinperfect.com/whitepaper*.

For more information, contact:
VinPerfect, Inc.
2650 Napa Valley Corp. Dr, Napa, CA 94558
tel: 707/252-2155, website: vinperfect.com

PLEASE SEE VINPERFECT AD, PAGE 35.

SAVERGLASS, INC.

For decades, Saverglass has been the supplier of choice for discerning wineries looking for classic but distinct bottle design, unmatched glass quality, and impeccable service. Whether the wine is a Bordeaux Grand Cru, an acclaimed Napa Cabernet, or a rising wine star in Paso Robles, Lodi, or Walla Walla, wineries continue to rely on Saverglass bottles for their exclusive wines. Saverglass brings innovative solutions to U.S. customers with the recent addition of the **EcoDesign** line of bottles, the **SelectColors** glass coloring process, and the 100% sustainable new **ColorPlay** decorating process.

SAVERGLASS
ESPRIT DESIGN

Saverglass offers:

- Classic but distinguishable bottle designs in standard colors: Antique Green, Champagne Green, Dead Leaf Green, Dark Amber, and Flint;
- Flexible production capacity with low volume minimums;
- More than 1,600 mold designs, many kept in stock;
- Unmatched glass quality, from design discipline, to glass-making expertise, and many quality controls;
- Expertise in specific mold development, and customization of existing molds;
- Capability to decorate glass bottles, now with ColorPlay organic inks;
- Bottles available directly from Saverglass Inc., or through selected U.S. packaging distributors.

For more information contact:
Saverglass Inc.
West Coast: Sylvie Langlois, Petra Gillier, Lili Sanchez
841 Latour Ct., Suite B, Napa, CA 94558
tel: 707/259-2930
East and Central States:
JC Forster, Joshua Heintz, Anna Cutri
107 Spring St. #210, Ramsey, NJ 07446
tel: 201/825-7100
website: www.saverglass.com

AMORIM CORK AMERICA

Amorim Cork America is a subsidiary of Amorim and Irmãos, the world's largest manufacturer of natural cork wine closures, providing cork sales and custom finishing to wineries throughout North America. In addition to offering ROSA, a proprietary treatment that reduces TCA, the company was the first to offer sustainable FSC-certified cork closures.

AMORIM CORK AMERICA

Amorim's natural cork products include:

Natural cork closures – recommended for all wines, especially those that require bottle aging;

Twin Top® closure – ROSA-treated agglomerated mid-body, and INOS II-treated end discs. Twin Top is widely accepted for its price, performance, and sensory neutrality;

Neutrocork® micro-agglomerated closure, made of small ROSA-treated particles, and price-competitive while maintaining excellent sensory values;

Acquamark®, an inexpensive all-natural closure for wines meant for early consumption;

Spark®, a sparkling wine closure that utilizes INOS II-washed disks to eliminate off aromas;

Spark One®, a unit-molded sparkling wine closure that provides excellent performance at an attractive price;

T-Cork®, a capsule-topped natural cork stopper that is ideal for fortified wines and spirits.

Amorim Cork America is a member of the Cork Quality Council.

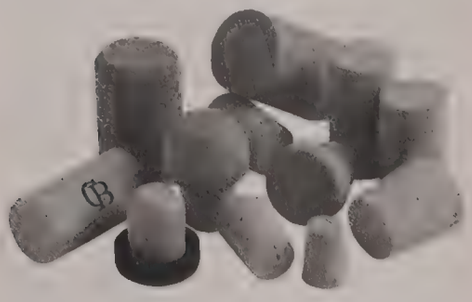
For more information, contact:
Amorim Cork America
2557 Napa Valley Corporate Dr. #A,
Napa, CA 94558
tel: 707/224-6000; fax: 707/224-7616
e-mail: info.acam@amorim.com
website: www.amorimca.com

PLEASE SEE AMORIM AD, PAGE 73.

CORTICA BENICIA USA

Cortica Benicia USA (CB USA) produces and distributes a large variety of corks, from very small tapered corks to champagne corks, wine corks to fit any bottle, bar tops (with both plastic and wooden caps), and more. CB USA will print, stamp, and/or color corks to match most designs. CB USA corks are scrutinized using the most sophisticated equipment available, and are very reasonably priced.

The laboratories of CB USA are state-of-the-art, analyzing corks of the highest quality. They are equipped with the latest mechanical, chemical, and sensory devices to ensure the very best product available. CB USA provides innovation and technology with an eye to sound environmental and ecological protection.



CB USA supplies a full range of products including:

- Premium natural wine corks,
- 1+1 (Twin-disc), champagne, and technical corks,
- Plastic champagne stoppers and wirehoods,
- Screw caps (tin and saranex),
- Capsules (polylam and PVC),
- Bar tops,
- Wax.

Visit the CB USA website for more information at www.cbcork.com.

For more information, contact:
Cortica Benicia USA
2487 Courage Drive, Fairfield, CA 94533
tel: 800/532-2207
e-mail: info@cbcork.com
website: www.cbcork.com

PLEASE SEE CORTICA BENICIA AD, PAGE 64.

ACH FOAM TECHNOLOGIES

ACH Foam Technologies is the first molder in the U.S. to offer 60% recycled content in an EPS packaging system. The high-performance WineLoc™ shippers offer unmatched protection and value, and the highest levels of reclaimed foam in the field. Manufactured with EcoSix™ reclaimed EPS resin beads by RAPAC, the foam shipping containers are some of the most efficient packaging materials available for wine.

ACH Foam Technologies developed an exclusive process to manufacture EcoSix and overcome the strength issues of EPS with high recycled content. With the help of industry specialists and third party quality assurance testing, EcoSix has successfully passed ISTA 3A drop tests for 60% recycled content, and it meets ACH Foam Technologies' strict quality standards.

In addition to the environmental advantages and unparalleled durability, WineLoc EPS wine shipping containers shield wine from temperature changes during shipment, to ensure the wine arrives safely to the customer. EPS wine packaging containers for single, multiple, and oversized bottles are in stock and do not require manufacturing lead-time, providing fast and efficient delivery to wineries.

For more information, contact:
ACH Foam Technologies
5250 N. Sherman St., Denver, CO 80216
tel: 303/297-3844; fax: 303/292-2613
e-mail: info@achfoam.com
website: www.achfoam.com

PLEASE SEE ACH FOAM TECHNOLOGIES AD, PAGE 20.

BOXWOOD

With more than 10 years' experience in package design for the wine industry, Boxwood's award-winning services include branding and name generation, label design, case design, website with ecommerce and mobile device access, business papers, and all peripheral media.

BOXWOOD

Boxwood's approach to graphic design is an inclusive process, establishing a clear direction and vision during the initial stages of goal setting, identifying objectives, concept design, preliminary cost estimating, and project scheduling. Boxwood believes that design and identity projects are accomplished as a collaborative effort, with best results when all project representatives participate in the creative process. Boxwood design solutions spring from the identity of the client, and the mission of the materials themselves.

From the design of a corporate identity, logotype, and multi-media web site, to the details integrated into a special mailer, the essence of the client's message and their DNA must be expressed. Beyond meeting functional expectations, Boxwood seeks to tell a story about the winery client, their mission, and values. Incorporating a seamless blend of art, content, and structure is only possible through close involvement with winery representatives, extensive project experience, and client understanding.

Current wine industry clients using Boxwood's packaging services include: Sestina; Obelisco Estate; Substance; Waters; 21 Grams; FIGGINS; Pepper Bridge Winery; and Northwest Wine Academy.

For more information, contact:
Boxwood
Joe Chauncey
1525 4th Ave. Ste. 600, Seattle, WA 98101
tel: 206/343-0236; fax: 206/343-0241
website: www.eboxwood.com

CRYOTECH INTERNATIONAL, INC.

Cryotech International, a Division of Chart Inc., is a leader in liquid nitrogen (LN_2) delivery systems for oxygen displacement. Cryotech has worked exclusively with winemakers to integrate and optimize technology on screw cap bottling lines, to reduce headspace oxygen, and extend shelf-life while preserving taste.

Cryotech's technology has consistently provided 90-95% reduction in headspace oxygen content, and 59% reduction in total package oxygen, compared to traditional gas nitrogen purging. This consistency allows winemakers to confidently control the use of sulfur dioxide while maintaining acceptable free sulfur dioxide levels.

One winemaker reported dissolved oxygen content less than 0.03 ppm without compromising the fresh fruit taste of the wine, with Cryotech's dosing equipment.

CRYOTECH INTERNATIONAL

Cryotech has a complete line of stand-alone dosing systems to accommodate a variety of bottling line conditions and speeds. A precise dose of LN_2 is injected into the bottle prior to capping. The liquid dose warms and turns into 700 parts of gas, displacing O_2 from the headspace. With more than 1,000 dosing systems installed, Cryotech has a wealth of application-specific knowledge.

For more information, contact:
Cryotech International, Inc.
161 Baypointe Parkway, San Jose, CA 95134
tel: 408/371-3303; fax: 408/577-1567
e-mail: salesinquiry@cryotechinternational.com
website: www.cryotechinternational.com

PLEASE SEE CRYOTECH! AD, PAGE 9

ENCORE!

ENCORE! has supplied and served wineries since 1975, and has grown to fulfill the glass and packaging needs of more than 1,000 wineries in the western U.S. Encore! has attained this growth by meeting and exceeding customer expectations, providing individual attention that wineries deserve.

Encore! distributes more than 90 wine molds in nine different colors, with various finishes in sizes from 187ml to 27L. Encore! also imports a wide selection of European style bottles for special bottling needs. Encore! provides mobile decanting services, and repacking alternatives.

With more than 30 years of experience, Encore! is a leading innovator in wine packaging to meet winery needs for bottles, ceramic decorating, litho cartons, specialty bottles, or regular bottling. Encore! is the exclusive supplier of Vinoseal, the elegant glass closure solution, in the U.S. Encore's sole focus is on value-added packaging for wineries.

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Developing fruit-driven wine styles through use of citrate-negative malolactic cultures

BY Hentie Swiegers[1], Lars Bo Corfitzen[1], Mansour Badaki[1], Kristine Bjerre[1], Annicka Bunte[1], Duncan Hamm[2], Nicolas Prost[3], Morten Hassing[1]

[1] Chr. Hansen, Wine Innovation Department, Hoersholm, Denmark
[2] Chr. Hansen, Oenologist, Global, Hungerford, United Kingdom
[3] Chr. Hansen, Oenologist, Montpellier, France

Corresponding author: Dr. Hentie Swiegers (dkhsw@chr-hansen.com)

Malolactic fermentation (MLF) is a key microbial process in production of most red wines and some white wines. In depth studies on the role of MLF on wine flavor only started appearing in the mid to late 1990s.[4,5]

However, the reality is that, as most winemakers understand, malolactic fermentation has a significant effect on the overall aroma and flavor of a wine. How does MLF affect wine flavor and aroma? In the following sections a short description will be given on MLF and wine flavor, focusing on diacetyl, one of the most important flavor compounds produced by malolactic bacteria.

Oenococcus oeni

The most well-known and commercially used lactic acid bacteria involved in malolactic fermentation is *Oenococcus oeni*. This organism has developed the special ability to survive and grow in the extremely harsh environment of wine (low pH, high alcohol, and high SO_2 concentrations).

Although other lactic acid bacteria can also conduct the malolactic fermentation, (*Pediococcus* ssp. and *Lactobacillus* ssp.), these bacteria are more sensitive to alcohol and low pH and hence only dominate in high pH wines with medium alcohol concentration.[3]

O. oeni has a heterofermentative metabolism.[3,6] In the presence of glucose /fructose (as is the case for grape juice), it will produce D-lactic acid, acetic acid, ethanol, and CO_2. In dry fermented wine, the major carbon sources that can be utilized are L-malic acid and citric acid, which are organic acids produced by the grape. The malic acid is converted to L-lactic acid and the citric acid is converted to acetic acid and diacetyl. Diacetyl can then be further metabolized to acetoin and 2,3 butanediol, which are also dairy-like flavor compounds but with much higher perception thresholds.[5]

Diacetyl

2,3 Butanedione (diacetyl) is a powerful flavor compound most often associated with dairy products such as yogurt and butter. Not surprisingly, dairy-related lactic acid bacteria are responsible for production of diacetyl in fermented milk and cheeses.

In wine, diacetyl is described as buttery or butterscotch. The perception of the buttery aroma depends on the concentration of diacetyl and wine type. In Cabernet Sauvignon it is high at 2.8 mg /l, Pinot Noir it is 0.9 mg /l, and Chardonnay it is 0.2 mg / l.[4]

It is important to understand that although diacetyl concentrations can be below perception threshold in many cases, it has a synergistic, complexing effect with other flavor compounds and therefore can have an underlying effect. On the other hand, depending on the concentration of other flavor compounds, buttery flavors can be masked even at high diacetyl concentrations.

Citrate-negative malolactic bacteria

Given that citrate metabolism by *O. oeni* is the main contributor of diacetyl, Chr. Hansen set out to develop and produce a strain that

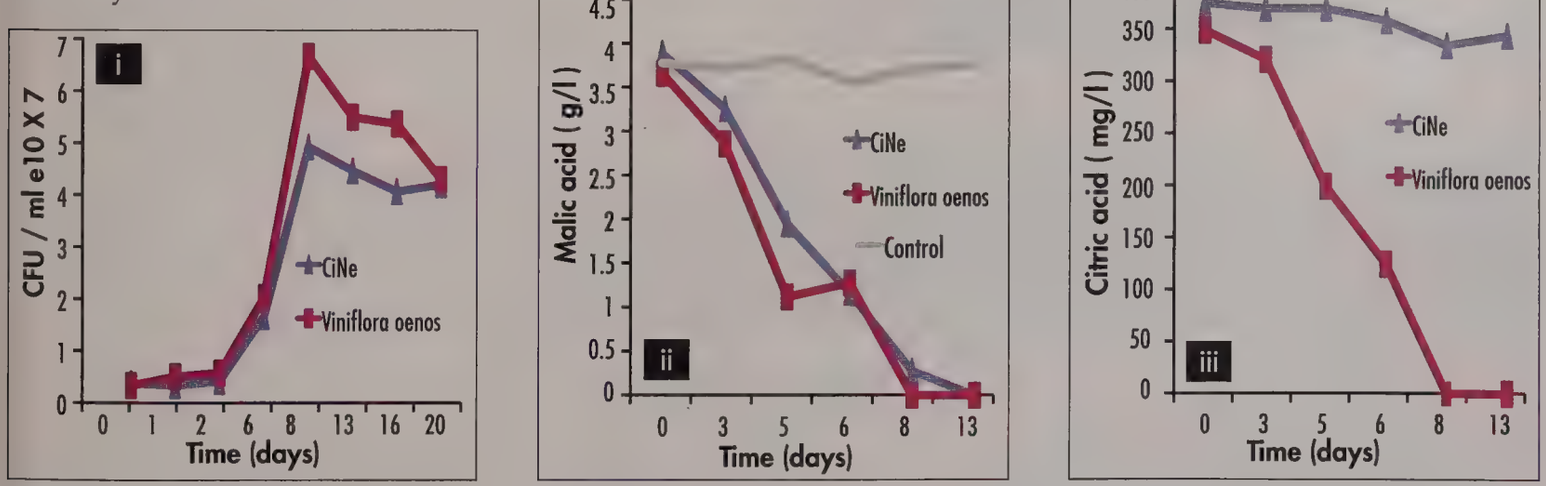

Figure 1: Effect of CiNe on (i) cell numbers, (ii) malic acid conversion (iii) and citrate concentration in a 2007 German Pinot Blanc, alcohol 13%, pH 3.5, 21°C.

does not metabolize citrate and therefore not produce diacetyl. Although there are many well-documented winemaking practices that limit or reduce diacetyl concentration, one of the most effective way to manage it is through the correct selection of malolactic strain.[2]

After significant investment in research and development, a citrate-negative strain (CiNe) was developed and produced to be used for direct inoculation in wine. Initial testing in the laboratory revealed that the CiNe strain behaved in much the same way as the standard Viniflora oenos strain in the following ways (Figure 1):

i) When directly inoculated CiNe survived harsh wine conditions of high alcohol and low pH (Figure 1, i)

ii) CiNe could grow in harsh wine conditions, almost increasing 1 log unit (Figure 1, i)

iii) CiNe converted all malic acid to lactic acid in the expected time frame (Figure 1, ii).

However, the main difference was that CiNe did not consume citrate as is the case for Viniflora oenos and the large majority of commercial *O. oeni* strains (Figure 1, iii). As a consequence, the acetic acid concentration was also lower, as citrate is a potential source of acetic acid in malolactic fermentations (Figure 2). Winemakers are well aware of this fact, volatile acidity almost always increases during malolactic fermentation, the main contributor being citrate conversion by *O. oeni*.

Citrate can be a dispensable substrate for bacteria

Although the importance of citrate in the metabolism of *O. oeni* has been widely debated in published literature and wine technical journals, we have not observed any adverse effects due to citrate non-utilization. Research by the University of Dijon in France indicated that citrate can have a negative effect on malolac-

Application of CiNe

Inoculation parameters for CiNe should be carefully followed in order to achieve an effective MLF. Alcohol concentration should be under 14%, pH greater than 3.2, and total SO_2 concentration under 30 ppm. High SO_2 concentrations can be a particular problem in white wines, especially in varieties where MLF is not normally desired such as Sauvignon Blanc. When winemakers choose to use CiNe in these types of wines, care should be taken to add only a small amount of SO_2 during crush (up to 50% of normal addition).

Another important parameter for use of CiNe is to keep temperature of the wine between 17°C (62°F) and 25°C (77°F), with an optimal of 22°C (71.6°F). Care should be taken in white wines such as Chardonnay, Riesling, and Sauvignon Blanc where alcoholic fermentations are usually conducted at low temperatures (14°-16°C [57°-61°F]). Therefore, upon completion of alcoholic fermentation, the temperature should be increased, if needed, and the CiNe directly inoculated into the wine (without rehydration in water or juice).

In red wines such as Shiraz, Merlot, Zinfandel, and Cabernet Sauvignon, the alcohol concentrations should not exceed 14%, which can be the case in warm wine producing regions such as the California Central Valley. CiNe should be directly inoculated straight after completion of alcoholic fermentation in a wine with a temperature of 17° to 25°C (62° to 77°F) but optimally around 22°C (71.6°F).

In order to avoid a potential wild, citrate-degrading malolactic bacteria to start consuming citrate and produce diacetyl, wines should be sulfured as soon as possible after MLF completion. This will ensure that the wine stays fresh and fruity.

As long as SO_2 levels remain stable, wine can remain on the malolactic lees until racking is required. No diacetyl will form from citrate if the wine is microbially stable with SO_2 addition to the wine on the lees.

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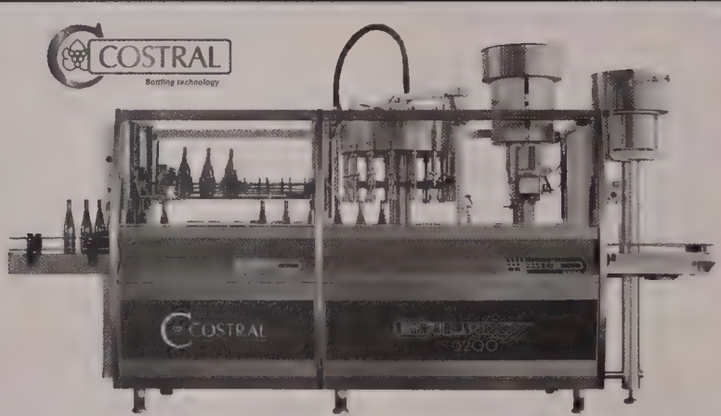

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tic fermentation, not directly, but through conversion to acetic acid, which has a toxic effect on *O. oeni*, more so at low pH.[1] Therefore, the extra acetic acid produced during MLF could potentially have a negative effect on malolactic bacteria, especially at low pH.

Successful production and testing of CiNe demonstrates that citrate is not essential for the efficient completion of MLF by *O. oeni* and that it does not affect the physiology of cell growth in sugar-based medium or wine. The success of CiNe in the market place, especially the tough German vintage of 2010 which saw extremely high levels of malic acid (results of are elaborated on in the next section).

Creating new wines

Trial results from Australia, France, Germany, New Zealand, and South Africa proved that:

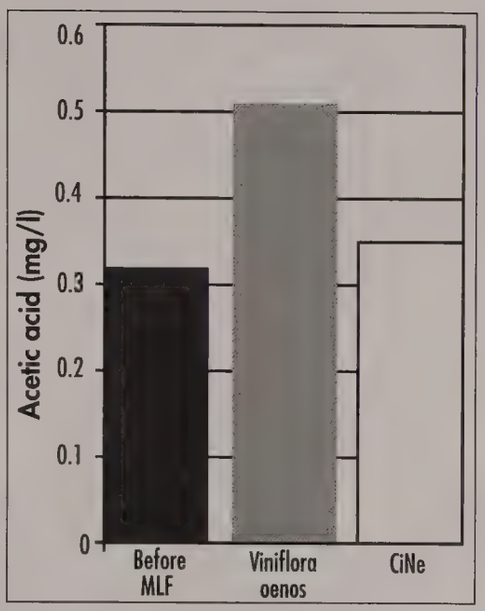

Figure 2: Concentration of acetic acid in 2007 Germany Pinot Blanc before and after malolactic fermentation with Viniflora oenos and CiNe.

a) CiNe can complete malolactic fermentation in a large range of wines and conditions,

b) The impact of CiNe on the aromatic profile of a wine is highly significant, more so than the differences created by current commercial strains and spontaneous malolactic fermentation.

Results from the German vintage of 2010 have been the most profound, especially given the abnormally high concentrations of malic acid and the desperate need for deacidification in white wines without adversely affecting the aroma and flavor of the wine (removing malic acid from Riesling without removing varietal character), where most other strains would result in an overly buttery, Chardonnay-like wine. Figure 3 demonstrates how effective CiNe was in the extreme German wines of 2010.

In France and South Africa, use of CiNe in sparkling base Chardonnay resulted in clean and crisp flavors,

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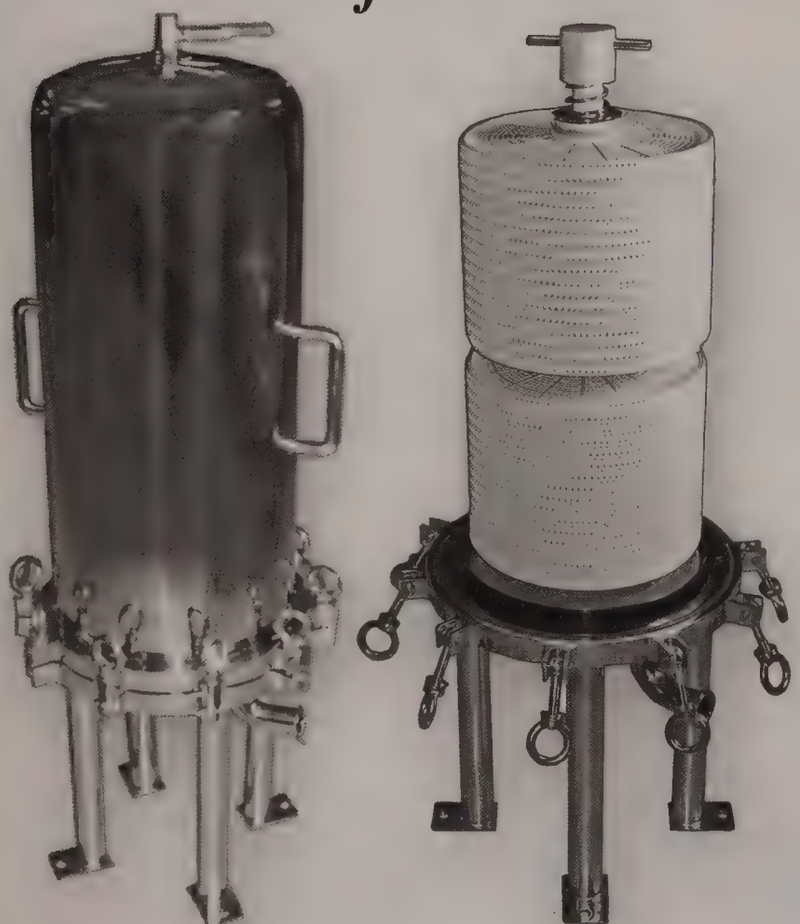

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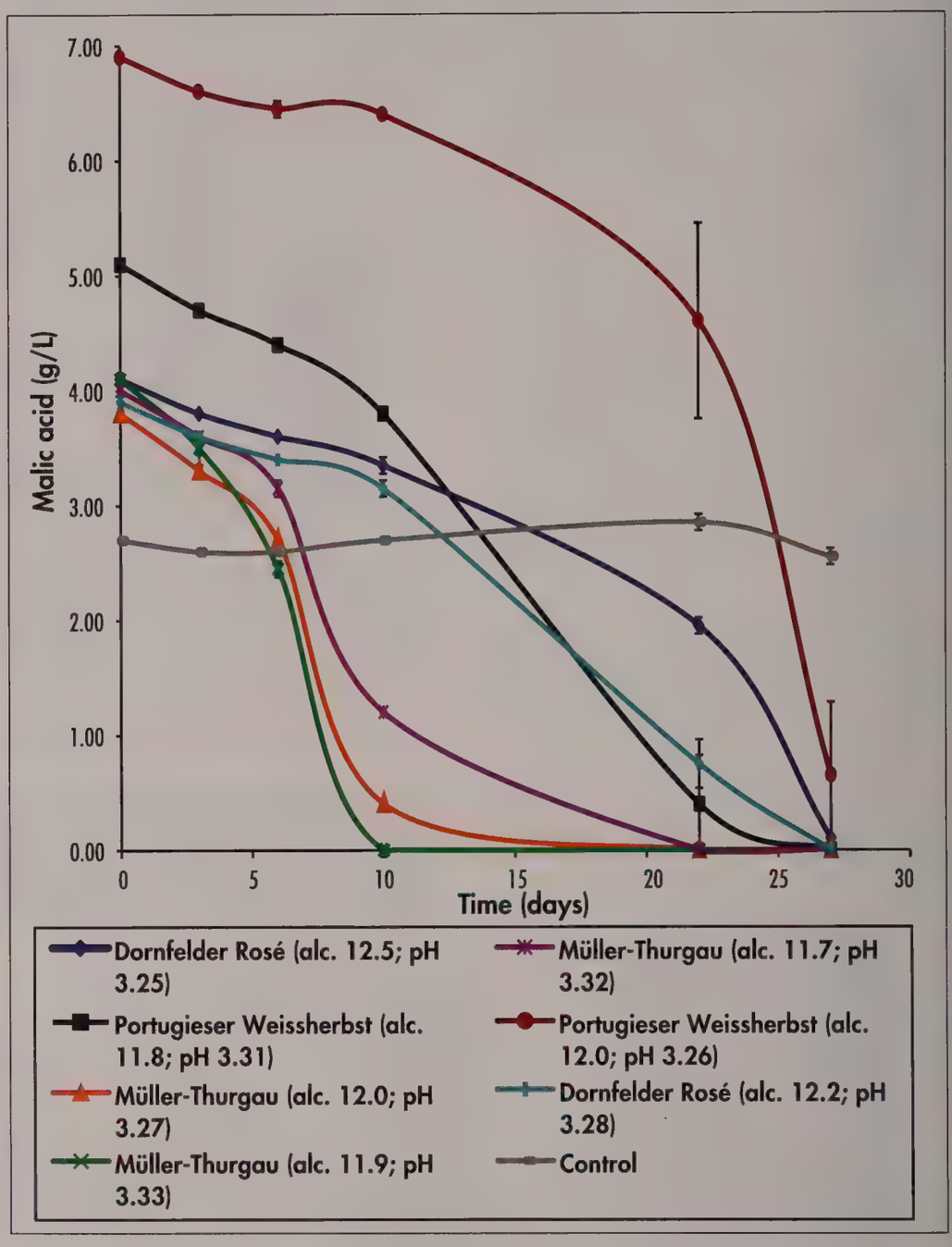

Figure 3: Performance of Viniflora CiNe in a range of German wines (vintage 2010).

unlike when other commercial strains were used (Figure 4). This style is particularly suited for sparkling wines where the perception threshold of diacetyl is at its lowest.

In Australia, trials were done at Devil Lair Winery (Western Australia) on Sauvignon Blanc, Chardonnay, and Cabernet Sauvignon. Wines were presented by Dayna Reynolds at the 2010 Australian Wine Industry Technical Conference in Adelaide. A tasting by a group of winemakers indicated that a Sauvignon Blanc using Viniflora CH35 malolactic strain, resulted in a wine that was almost Chardonnay-like (most of the Sauvignon Blanc character was lost and subsequently dominated by buttery, creamy-like aromas).

On the other hand, use of the CiNe strain, resulted in a wine that retained Sauvignon Blanc character with one winemaker noting that it was more varietal than the non-MLF control. Sauvignon Blanc trials in New Zealand produced similar results.

The main difference between the

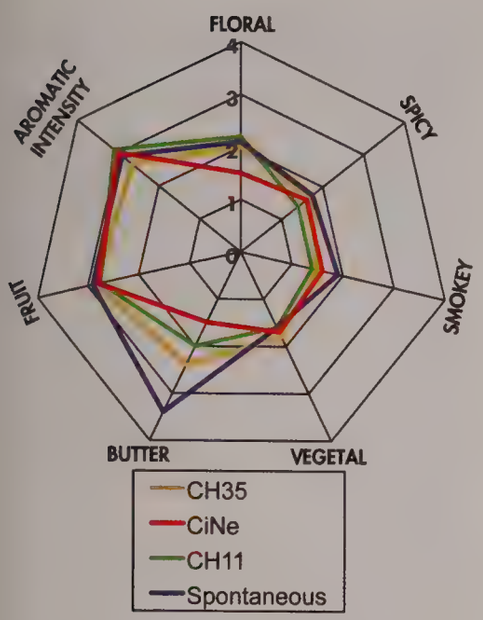

Figure 4: Effect of CiNe on a French sparkling base Chardonnay (2009). Spontaneous malolactic fermentation resulted in the highest 'buttery' aroma followed by CH35, CH11 and finally CiNe, where buttery aroma was hardly perceivable. CiNe produces the most neutral wine, which is the most preferable style for sparkling base.

CiNe-treated Sauivignon Blanc and the non-MLF control Sauvignon Blanc was that the CiNe wine was much smoother in the mouth and less sharp which is a consequence of the conversion of malic acid to lactic acid and production of polysaccharides by the bacteria.

In the Chardonnay, Viniflora CH35 produced a classical, full-bodied wine with rich buttery aromas whereas CiNe produced a clean, fruity wine without the phenolic sharpness often associated with no-oak, non-MLF Chardonnays.

In the Cabernet Sauvignon wines, CiNe resulted in a fresh, fruity wine comparable on the aroma with the no-MLF control. However, the no-MLF control was completely unpalatable as the malic acid creates a harsh, metallic-like taste in combination with red wine phenolics. Viniflora CH16 created the classic, complex flavors associated with red wine MLF.

Conclusion

CiNe can be used to de-acidify, and smooth out white wines without affecting varietal character. A word of caution on the white wines though, traditionally winemakers are quite generous with the addition of SO_2 to white wines where MLF is not required, both to protect against oxidation and for microbial stabilization. Therefore, if a winemaker intends to use CiNe (or any other Viniflora bacteria) on a white wine, SO_2 concentrations in the must should be kept to a bare minimum. It should also be noted that malolactic bacteria consumes acetaldehyde and can remove some oxidative aroma characters from wine.

In red wines, CiNe created a palat-

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able wine that was fresh and fruity, unlike the traditional, richer aromas associated with red wines. In fact, the aromas of the CiNe wines where much the same as the fresh, fruity aromas observed in red wines straight after alcoholic fermentation (but before malolactic fermentation). However, unlike the ontrol red wine that did not undergo malolactic fermentation, the CiNe wine was soft on the palate, lacking the harshness of the control wine.

Therefore, CiNe assisted in creating a whole new style of red wine, one that cannot be mimicked by spontaneous malolactic fermentation or other commercial strains of malolactic bacteria. ■

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Influence of yeast strain selection on SUCCESSFUL MALOLACTIC FERMENTATION

BY Nichola Hall, Ph.D., Scott Laboratories, Petaluma, CA

"Wine is not a natural product, but vinegar is," said Professor Isak Pretorius (managing director of the Australian Wine Research Institute) at a recent wine microbiology symposium. This reminds us of two elemental facts. First, wine is the complex result of microorganisms interacting with their environment. Second, the control of this process by the winemaker helps assure that wine can be enjoyed on a global scale.

Though the wine and grape matrix is often described as providing a difficult environment for the growth and survival of microorganisms, a specific and very distinct group of microorganisms is essential to the production of high-quality wines. The yeast *Saccharomyces* is one of those organisms. Its ability to proliferate and implant into the matrix changes grape must into wine.

Due to the consistency of performance, *Saccharomyces cerevisiae* is generally the organism of choice to complete the alcoholic fermentation process. Enological strains of *Saccharomyces* spp. have been available in the active dried form for more than 40 years. Great strides have been made from a technological viewpoint.

Due to the natural diversity that has brought us to where we are today, we can separate enological yeast strains into two groups: primary strains and specialty (or technological) strains. Primary strains such as EC-1118™ and BC™ can complete alcoholic fermentation with minimal sensory deviations. Specialty strains such as RC212®, QA23™, and ICV D-254™ have supplemental abilities in addition to their secure fermentation performances, which may include the revelation of varietal aromas, production of fermentation aromas, action on the wine texture via the production of polysaccharides, or the stabilization of color (via polyphenolic-polysaccharide interactions).

Irrespective of strain choice, however, good fermentation practices must be followed. This includes applying appropriate nutritional strategies and controlling the fermentation temperature (thereby minimizing the production of undesirable yeast metabolites).

Choosing a yeast strain for a successful fermentation includes knowing some basic parameters about your grape must and extrapolating details about the resulting wine (potential alcohol). This initial decision of whether the yeast strain can withstand the alcohol that is to be produced is important, as are the temperature constraints of the yeast strain, its nutritional requirements, lag phase length, competition with other organisms, and rehydration specifics. It is also important to determine whether the yeast strain promotes a healthy malolactic fermentation.

Malolactic fermentation (MLF) is the conversion of L-malic acid to L-lactic acid by lactic acid bacteria, namely *Oenococcus oeni*. Strains of *Lactobacillus plantarum* (V22™), however, are also available for this conversion in high pH situations (above pH 3.5, with no volatile acidity increase from grape sugar metabolism).

The topic of malolactic fermenta-

Table I: Influence of fatty acid on malic acid degradation

Wine	Malic Acid (day 4)	Malic Acid (day 14)	% malic acid degraded (after 14 days)
Control	2.19	0.53	81
Wine + C6 (145 µM)	2.24	0.46	84
Wine + C8 (145 µM)	2.33	0.70	75
Wine + C10 (145 µM)	2.46	1.18	58
Wine + C6 (52 µM) + C8 (71 µM) + C10 (22 µM)	2.40	1.45	49

C6=(hexanoic acid), C8=(octanoic acid), C10=(decanoic acid) (Lonvaud-Funel et. al., 2009)

Table II: Yeast/Bacteria Compatibility

Compatibility*	MOST COMPATIBLE: 5	4	3	2	LEAST COMPATIBLE: 1
	++	+	+/-	-	-
Yeast Strain	QA23™ ICV D254® 71B® AMH™ W15™ VRB®	R2™ M2™ CY3079® RC212® 43® ICV GRE™ ICV D47™ CEG BC™ DV10™ L 2056® ICV D80® Rhône4600® R-HST®	EC1118™ PdM ICV D21® BDX™ BRL97™ CrossEvolution® BGY™ CSM™ RP15™ T306® Syrah™	RA17® L2226™ BM45™ BM4x4® BA11™	M1™ K1(V1116)™ ICV Opale®

*Level of compatibility can be manipulated depending upon winemaking practices and fermentation nutrition regime.

tion always leads to lengthy conversations due to the different formulations available (direct addition, 1-step preparations, or standard build-up cultures), different inoculation protocols, and yeast strain compatibility with ML bacteria.

The winemaker must meet the challenges faced by *O. oeni*. Such challenges include when the ethanol level increases above 14%, pH values are below 3.2, free sulfur dioxide levels are above 10 ppm, total sulfur dioxide levels are above 30 ppm, or the temperature is below 16°C.[2]

The conditions for success, although well documented and understood by winemakers, can still result in problems. These parameters must be viewed in combination (such as SO_2 *and* pH) and not individually (SO_2 *or* pH).

A recent focus has been on the isolation of strains with wider environmental limits. It is now possible to successfully achieve MLF in wines in excess of 16% alcohol. In addition to attempting to predict the success of MLF using the aforementioned parameters (alcohol, pH, SO_2 concentration, temperature), we must also consider the initial malic acid level, the polyphenolics content, and the organism(s) that may be present and their metabolites.

Enological organisms and their relationships

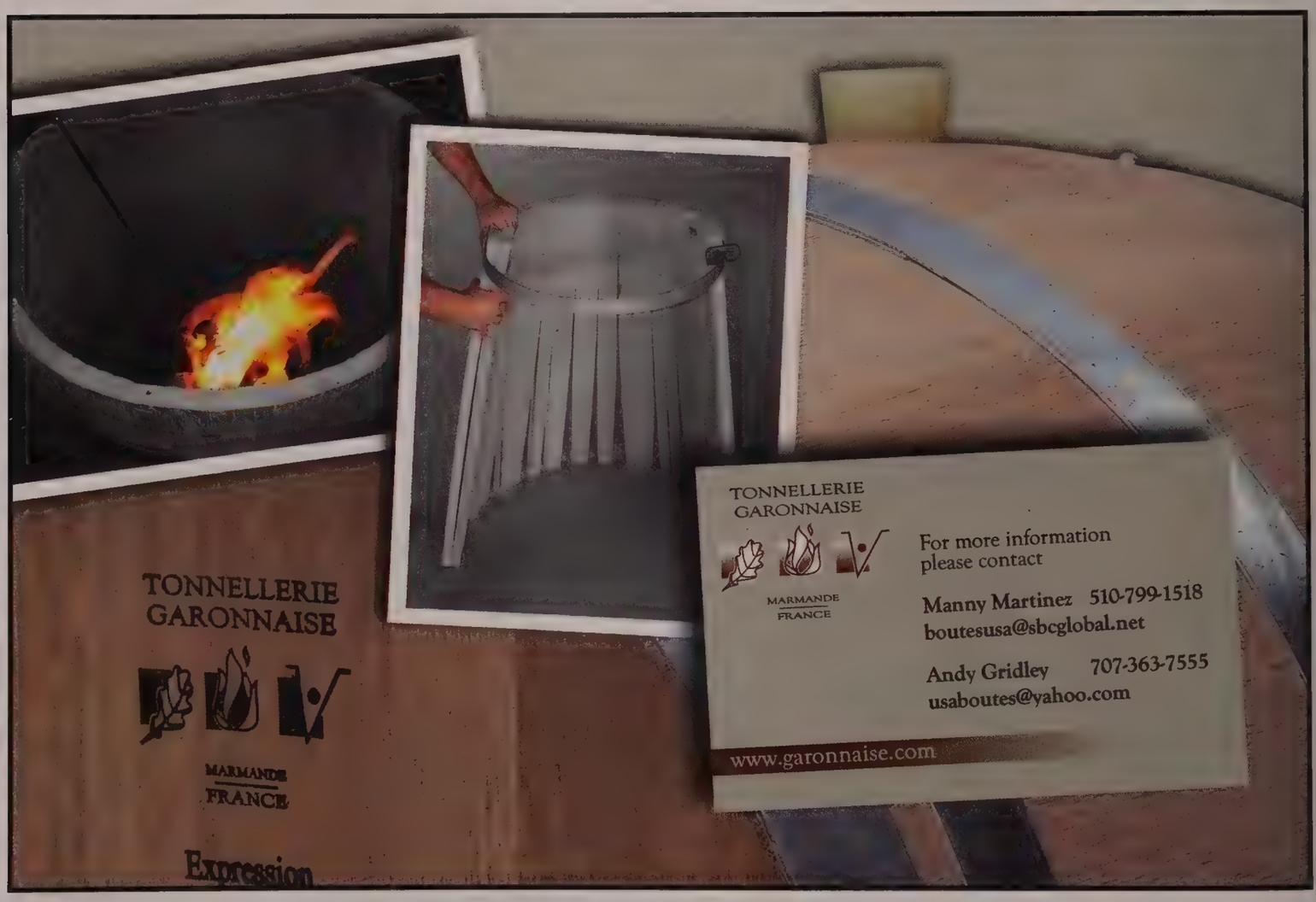
There are currently approximately 150 diverse enological strains of *Saccharomyces cerevisiae* that have been isolated from the natural environment for a winemaker to choose from, plus 30 strains of *Oenococcus oeni*. If we extrapolate the number of combinations that can exist we would have 4,500. With so many combinations of yeast and bacteria that may be present (excluding native organisms), how can we predict the relationship between organisms and the resultant outcome of such relationships in our wines?

The relationships known to exist between *S. cerevisiae* and *O. oeni* include amensalism, predation, commensalism, mutualism, and protocol-operation.[2] Put more simply, the relationships can be described as inhibitory, stimulatory, or neutral.

Inhibition of *O. oeni* by wine strains of *S. cerevisiae*

Ethanol was the first yeast metabolite reported as being antagonistic toward *O. oeni*. It is generally accepted that average ethanol levels in table wines are increasing. Thus ethanol tolerance is an important consideration when selecting a bacteria strain. Ethanol affects the growth of the bacteria, but not malic degradation. Malic degradation, however, will not begin until the bacteria cell population reaches $1x10^6$ cells/mL. Inoculation rates must be respected for a rapid start.

Addition of sulfur dioxide is an integral part of current winemaking prac-



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tices. *O. oeni* is more sensitive to the anti-microbial effects of SO_2 than other lactic acid bacteria (*Lactobacillus* spp. and *Pediococcus* spp) or yeast. It is not always recognized that *S. cerevisiae* can produce significant amounts of SO_2 on its own. This was initially discovered by Fornachon (1968).

The amount of SO_2 produced is highly dependent upon the strain of yeast and composition of the medium. Yeast strains are classed as low, medium, or high SO_2 producers. The amount of SO_2 produced can range from ~20 ppm to in excess of 90 ppm. It is essential to know the SO_2 levels (both free and total) in a wine.

Fatty acids can be produced by yeast. Their production is dependent upon the must composition, grape cultivar, yeast strain, fermentation temperature, and winemaking practices. Short and medium chain fatty acids (hexanoic, octanoic, and decanoic acid) are reported to inhibit bacteria and yeast. These acids can target and alter the bacterial membrane, resulting in limited growth and reduced ability of the bacteria to degrade the malic acid (Table I).

Table III: Assessing wine conditions for malolactic fermentation

Factors relating to alcoholic fermentation	1 point	2 points	8 points	10 points
Alcohol (% v/v)	Under 13%	13 to 15%	15 to 17%	17% +
pH	Above 3.4	3.1 to 3.4	2.9 to 3.1	Under 2.9
Free SO_2 (mg/L)	Under 8	8-12	12-15	Above 15
Total SO_2 (mg/L)	Under 30	30-40	40-60	Above 60
Malic acid level (g/L)	2-4	1-2 or 4-5	0.5-1 or 5-7	<0.5 or >7
Temperature (°C)	18-22°	14-18°	10-14°	Under 10°
Yeast nutrient demand	Low	Medium	High	Very High
Alcoholic fermentation rate	Less than 2° Brix/day	2 to 4° Brix/ day	4 to 6° Brix/ day	>6° Brix per day
Ease of alcoholic fermentation	No Problems	Transient yeast stress	Sluggish/stuck ferment	Prolonged yeast contact
Conditions for MLF	Favorable (under 10 points)	Difficult (11 to 20 points)	Harsh (21 to 40 points)	Extreme (40+ points)

(Dr. Sibylle Krieger-Weber, Personal communication)

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It has also been demonstrated that fatty acids work in synergy with ethanol and pH, resulting in even more challenging conditions. On a positive note, it is possible to remove fatty acids via adsorption by yeast ghosts (hulls).

A number of yeast-derived metabolites can exert an inhibitory effect on ML bacteria. Some can be measured (ethanol and SO_2), while others are more challenging to assess (fatty acids). Not all malolactic fermentation inhibition can be attributed to the production of yeast-based metabolites.

During alcoholic fermentation the microflora present can utilize macro and micronutrients. This may result in a nutrient-depleted environment for the fastidious *O. oeni*. From a nutritional standpoint, *Oenococcus* spp. require amino acids, as they do not have the ability to assimilate ammonium salts. The individual amino acids that the bacteria require vary depending on the strain. Using knock-out studies, it has been observed that some strains require as many as 13 of the 20 amino acids.[7] These amino acids are deemed to be essential, and others may be necessary as well. If they are not present, growth cannot occur.

In addition to amino acids, it is essential that wine bacteria are supplied with peptides, vitamins (biotin, thiamine, nicotinic acid, and pantothenic acid), and minerals (manganese, potassium, and magnesium).

Since we have no practical means of determining amino acid deficiencies for bacteria, we may not be aware that the bacteria are encountering a nutritionally-depleted environment. We can, however, "guestimate" if we know both the yeast assimilable nitrogen concentration at the beginning of the alcoholic fermentation plus the specific nitrogen requirements of the wine yeast used.

S. cerevisiae are classed as low, medium, medium-high, high, and very high with regards to their nitrogen requirements. The different yeast strains available vary significantly in the amount of nitrogen they need to assimilate 1 g/L of sugar. This amount may vary from 0.5 to 1.35 ppm of available nitrogen, with the ex-*S. bayanus* strains requiring even more.[6]

Other lesser known factors can also cause inhibition of bacteria. These include alterations in acidity due to either the utilization of malic acid by yeast (or other bacteria) or by production of succinic acid.[4] Production of the aromatic compound ß-phenylethanol (floral) by cryotolerant yeast species can also have a negative effect on the growth of *O. oeni*.[1]

Inhibition of *S. cerevisiae* by *O. oeni*

In certain situations during the alcoholic fermentation, the presence of

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O. oeni can have a negative effect on *S. cerevisiae*. Some bacteria have the ability to utilize the grape sugars and produce acetic acid. It has been speculated that acetic acid alone may not be antagonistic, but when in combination with other metabolites, it can lead to an accelerated death of wine yeast.

Suggested causes of accelerated death include the formation of inhibitory metabolites or depletion of essential nutrients and survival factors that are essential to the wine yeast. Other bacterial inhibitors that may have a negative effect on wine yeast include bacterial protease production, extracellular glucanase activity, and bacteriocin-like inhibitors.[1]

Stimulatory interactions

Not only negative interactions can occur. *S. cerevisiae* can stimulate the growth of *O. oeni*. This stimulation is thought to be related to the yeast autolysis rate. It is during yeast autolysis that the nutritional composition of the matrix is altered, favoring the release of mannoproteins and amino acids.

The released mannoproteins have a dual function. They can detoxify the medium and protect the cells from potential polyphenolic inhibition. Mannoproteins may have an additional role in enhancing the nutritional content of the wine. This is possibly due to the glycosidase activity in *O. oeni* that results in hydrolysis of the mannoprotein. The release of amino acids and peptides can shorten the lag phase of the bacteria and increase the biomass. Yeast autolysis rates are highly strain- and environment-dependent.

To help the winemaker make decisions on yeast/bacteria compatibility, Table II has been developed by Lallemand (adapted for strains available in the North American market).

Based on current knowledge, the success of malolactic fermentation is due to the winemaker's strain choice(s) for alcoholic and malolactic fermentations, environmental conditions, and winemaking practices employed.

It is recommended that the malolactic fermentation be planned in conjunction with the alcoholic fermentation in order to maintain wine quality and consistency. Table III summarizes the many factors that can play a role in the outcome of malolactic fermentation.

If your wine shows that favorable or mildly difficult conditions exist, a direct bacteria addition can be used. If the conditions indicate that harsher conditions exist, the best approach would be to try a one-step formulation (final acclimatization conducted in your wine). If extreme conditions are apparent, a standard build-up culture would be recommended. ■

References on page 96

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EXCERPT FROM E-GUIDE

50 TIPS FOR CELLAR RATS:

How to get (and keep) a great job as a winery cellar rat or harvest intern

BY **Mary Baker**

Do you want to work harvest at a winery? Are you looking for excitement? Want to learn more about wine production? Do you want to sink your hands into a\bin of warm, fermenting, aromatic must, and breathe deeply of the perfume of *terroir*.

Right. Well, so much for fantasy.

Working crush at a winery is one of the most exciting work opportunities in the world. You might be working with men and women who are simultaneously artists and scientists, farmers and celebrities.

But you have got a long way to go before any winemaker is going to trust you with his machinery, his wine, and his livelihood. I want to prepare you for a grueling, exciting experience as a winery volunteer, cellar rat, or intern.

In this guide, you are going to hear me say *don't do this* and *don't do that*. You are going to hear me say this **many times**. I want to help you avoid the kind of mistakes that do not get you invited back. Or worse, make you infamous. Yes, I see you rolling your eyes. But by the time you finish reading this eGuide, you will know that there is an industry roster of the *Most Royal Muck-ups of All Time*.

Samples from the 50 Tips:

Prepare for harvest well ahead of time. Learn basic wine terminology; practice and improve your wine evaluation skills; study for credentials; and prepare your body for the rigors of crush.

2. Study the science of winemaking. You don't need to be a lab rat or wine scientist to be valued by a winery, but you should familiarize yourself with some basic chemistry, especially as it relates to wine.

3. Forklift training and certification is advisable.

5. Bring work-appropriate clothing and gear. Jeans, good work boots, a pair of supple, cheap work gloves, several pairs of breathable socks, Crocs or other rugged summer footgear.

8. Stock up on vitamins and nutrients.

9. Stay hydrated!!

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12. Stock your temporary harvest lodgings with groceries that are filling, fast and easy to cook, and will pack on the energy you are going to need.

14. Walk into your new job with an open and humble attitude.

17. Ask questions about everything.

18. Take notes.

22. Take health and safety rules seriously.

23. Respect equipment safety rules. Don't just *respect* equipment safety – *live* by the rules. Never underestimate the equipment.

28. Respect cellar hygiene.

32. Make sure you are alert and fully involved in the daily review. You should always know what the rest of the staff is doing or about to do.

46. If you are asked to work in the tasting room as a sales assistant, embrace the opportunity.

47. Do not plan to give your friends or family tours of the winery without your supervisor's permission.

A true cellar rat – a designation of fond praise within the industry – will be the last person on the crush-pad, hosing all the muck out of the crusher on a cold and frosty October evening, after the winemaker and his entourage have all retired to a warm and well-lit restaurant.

You are not working for free. You are involved in an exchange. The winery is imparting valuable education and experience. Arrive prepared with good health, warm clothing, an open attitude, and all the best advice to be a successful cellar rat. You can still have fun working for a winery, especially the small to mid-size wineries where the owners are slightly zany. Just remember to always treat the opportunity with respect. ■

Full text of this eGuide ($5.99) or print brochure ($7.99) © Mary C. Baker, March 2010, is available for sale at LuLu.com

Mary Baker is a 20-year veteran of the wine industry who has worked as a cellar rat, tasting room hostess, business manager, and winery general partner. She helps small wineries with marketing, social media, and business coaching, and hosts a popular industry site, Central Coast Wine Blogs. She can be reached at mary@centralcoastwineblogs.com.

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PERFORMANCE OF NON-*SACCHAROMYCES* YEASTS DURING ALCOHOLIC FERMENTATION: SPECIFIC CASE OF *TORULASPORA DELBRUECKII*

BY **Philippe Renault,** SARCO, Bordeaux, France,
Maryam Ehsani, Laffort, Bordeaux, France,
Charlotte Gourraud, Laffort USA,
Marina Bely, University of Bordeaux

Yeasts present in grape must can be classified into two groups: *Saccharomyces cerevisiae* yeasts and non-*Saccharomyces* yeasts. The latter represent the majority of yeasts found on grapes and can be detected throughout alcoholic fermentation.

During a spontaneous fermentation with the indigenous microflora, non-*Saccharomyces* yeasts prevail in the must during the pre-fermentative phase and at the beginning of alcoholic fermentation, before the *S. cerevisiae* yeasts colonize the medium to complete fermentation. [6,11,13] The predominance of the non-*Saccharomyces* during the beginning of alcoholic fermentation generally leaves fingerprints of the indigenous flora on the final composition of the wine contributing, in particular, more aromatic complexity.

In order to evaluate the enological potential of the species *Torulaspora delbrueckii*, a non-*Saccharomyces* yeast naturally present in must, experiments were conducted that indicated significant intraspecific variability, in particular regarding its fermentative capacities (lag phase, duration of fermentation, maximum ethanol production) and of its volatile acidity (VA) production.

The experiments showed that *T. delbrueckii* produced, in general, less VA than *S. cerevisiae*. This species is also phenolic off-flavor negative (POF-), thus producing little or no volatile phenols. In spite of a good ethanol production capacity for a non-*Saccharmomyces*, in order to exploit its specific metabolism, *T. delbrueckii* must be associated with *S. cerevisiae*.

Transformation of grape juice into wine is a complex microbiological process. The organoleptic diversity of wines globally is due to many factors, the principal ones being the soil, type of vine, climatic conditions, and enological practices. During winemaking, the microflora, made up of various *S. cerevisiae* strains and various non-*Saccharomyces* species, contribute to this complexity.[11,13]

Development of certain non-*Saccharomyces* yeasts during a spontaneous fermentation can be prejudicial with respect to the quality of a final wine (*Brettanomyces bruxellensis*, *Zygosaccharomyces baili*, etc.). Other non-*Saccharomyces* yeasts can contribute to the intensity and aromatic complexity of the wine in specific ways, according to the yeast genre, the species, and the strain used.

Wine quality and stylistic integrity reflect all contributing microbial developments from grape harvest to bottling. In this process, it is paramount to promote the microbial species of interest and to control spoilage organisms.

Torulaspora delbrueckii is a non-*Saccharomyces* yeast that is naturally present on grapes and in grape must, and has been described in the literature for its positive impacts on the quality and the complexity of wines,[4,5,8] and for the "cleanness" of fermentations with, in particular, low VA, acetaldehyde, diacetyl, and acetoin production.[2,8,12] *Torulaspora delbrueckii* is also described as being both cryophilic and osmotolerant.[7]

Expansion of general knowledge on T. delbrueckii species: Intraspecific variability

In order to evaluate the enological potential of *Torulaspora delbrueckii*, a collection of 30 strains was studied. Various experiments were set up in synthetic media that was similar to the composition of grape must. Under conditions of 17°C and 24°C, the ethanol conversion rate of *T. delbrueckii* calculated at the end of alcoholic fermentation was equivalent to the ethanol conversion rate of *S. cerevisiae*. This result was found to be similar for all *T. delbrueckii* strains tested from the collection.

Many experiments highlighted, however, significant phenotypical variability within this species.[10] Indeed, the fermentative capacities, evaluated by the lag phase (time between inoculation and beginning of fermentative activity), duration of fermentation, and maximum ethanol production were

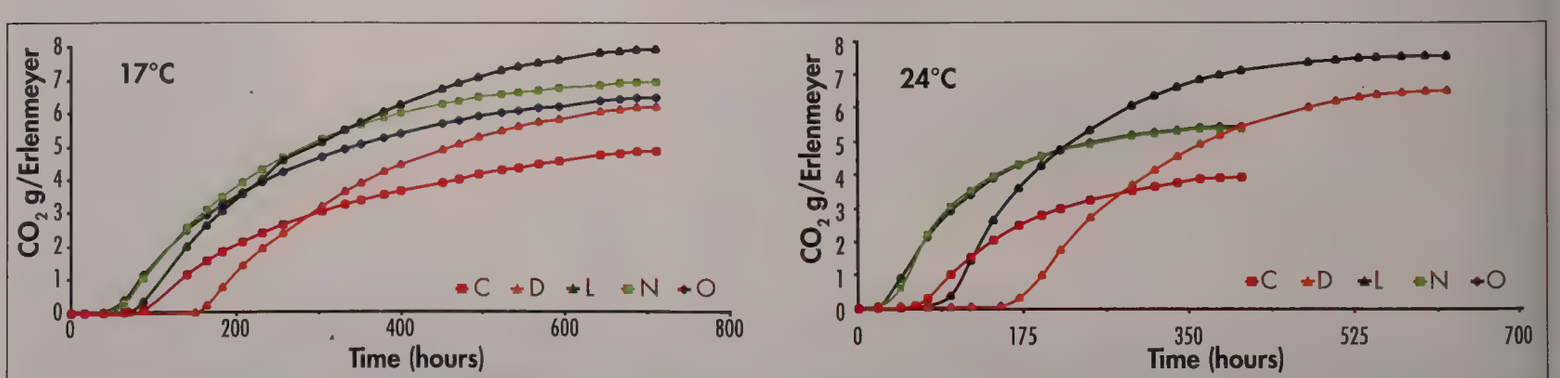


Figure 1: Fermentation kinetics of five *T. delbrueckii* strains (of 30 tested) labelled C, D, L, N and O, in a synthetic medium containing 240 g/L of sugar, fermented at both 24 and 17°C.

different according to the strain. These three parameters are crucial regarding the strain's potential for industrial selection, in particular the lag phase, which must be as short as possible to ensure rapid initiation of fermentation.

There is competition between all yeasts present in the microfloral spectrum of grape must. Figure 1 presents the fermentation kinetics of five *T. delbrueckii* strains (of 30 tested) in a synthetic medium containing 240 g/L of sugar (24° Brix), fermented at both 24° and 17°C (75° and 62°F). Under laboratory conditions, the lag phases were found to vary significantly from one strain to another: from 20 to 150 hours at 24°C/75°F and from 50 to 160 hours at 17°C/62°F.

Ethanol production, under the same conditions, varied from 8% to 12% vol. at 17°C (62°F) and from 7% to 11% vol. at 24°C (75°F) (Figure 2). Ethanol production of each *T. delbrueckii* strain, although lower than those of *S. cerevisiae*, is nevertheless relevant for a non-*Saccharomyces* yeast, considering it produced ethanol up to 12% vol.

Phenotypical variability of *T. delbrueckii* is also expressed by VA and glycerol production. The production of these compunds was evaluated on three synthetic media with different sugar concentrations (120, 240, and 350 g/L), and was compared with those from two *S. cerevisiae* strains: Zymaflore ST, a strain isolated in Sauternes producing low VA and usually used for the production of *Botrytis* wine, and SB (from the collection of the oenology faculty of the University of Bordeaux). (Data shown in Figure 3.)

Significant differences exist between the *T. delbrueckii* strains with respect to VA and glycerol production, indicative of strong intraspecific variability for these parameters. The average production of VA and glycerol was found to be significantly different between *T. delbrueckii* and *S. cerevisiae* with increasing sugar concentrations (from 240 to 350 g/L).

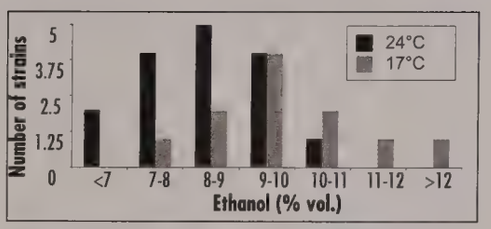
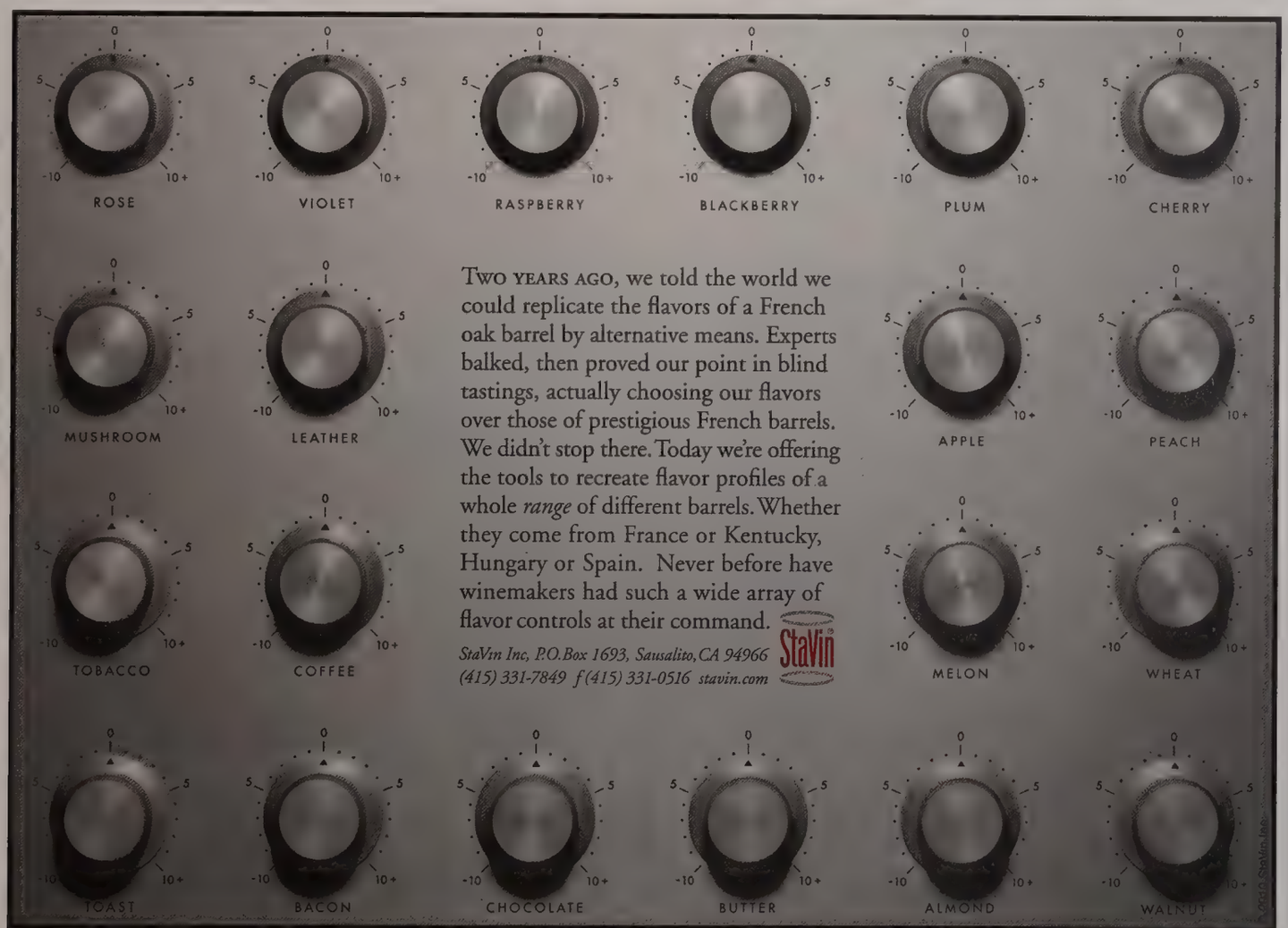


Figure 2: Ethanol production of selected *T. delbrueckii* strains, fermented in a synthetic medium containing 240 g/L of sugar at both 24°C and 17°C.

In the medium with 350 g/L sugar (35° Brix), the great majority of the *T. delbrueckii* strains examined had significantly lower VA production than that of *S. cerevisiae* Zymaflore ST which, nevertheless, is a low VA-producing *S. cerevisiae* reference. This clearly demonstrates that *T. delbrueckii* responds differently to the osmotic pressure of its environment than *S. cerevisiae*, for which the increase in the sugar concentration results systematically in a higher production of both glycerol and VA. This phenotypical property of *T. delbrueckii* is very interesting, in particular in the case of sweet wine production.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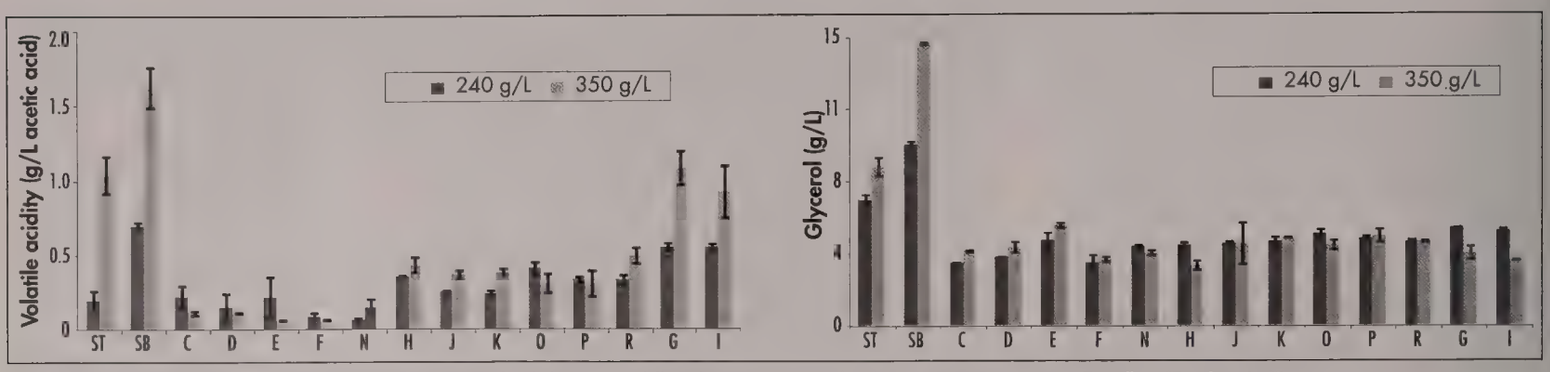

Figure 3: Volatile acidity and glycerol production at differing sugar levels by some *T. delbrueckii strains* compared with two *S. cerevisiae* strains, Zymaflore ST and strain SB.

In addition to the lower VA production exhibited, results showed that *T. delbrueckii* produces low amounts of other undesirable sensory compounds such as hydrogen sulfide and volatile phenols, reflecting the "cleanness" noted from its fermentations.

The production of volatile phenols by various *T. delbrueckii* strains was quantified according to the method developed by P. Chatonnet et al.,[3] and compared with the production of two *S. cerevisiae* strains — one POF+ (phenolic off-flavor positive) and the other POF- (phenolic off-flavor negative).

Under our conditions, the POF+ strain produced ten times more volatile phenols (vinyl-4-phenol and vinyl-4-gaiacol) than the POF- strain (Zymaflore VL1), corresponding to approximately 27 mg/L and 2.6 mg/L respectively (Figure 4). The average production of *T. delbrueckii* was 1.9 mg/L, even lower than the POF- *S. cerevisiae* negative control strain. *T. delbrueckii* displayed great phenotypical variability for this criterion, with strains producing up to 23 times fewer volatile phenols than the reference POF- *S. cerevisiae* strain, which is considered to be a low producer of volatile phenols.

Only five *T. delbrueckii* strains had volatile phenol productions slightly higher than the POF- *S. cerevisiae* negative control (up to 10% more), but always at least 10 times lower than the POF+ *S. cerevisiae* positive control. Importantly, in terms of spoilage characters, no *T. delbrueckii* strain produced the strongly percieved off-aroma from 4-ethylphenol or 4-ethylgaiacol.

The resistance of different *T. delbrueckii* strains to SO_2 was evaluated. Fermentation kinetics (evolution of CO_2 release) of three *T. delbrueckii* strains and one *S. cerevisiae* strain (Zymaflore ST) in a synthetic medium with three ascending free SO_2 concentrations (10, 25, and 36 ppm corresponding to, respectively, 2, 43, and 75 ppm total SO_2) are presented in Figure 5. For the same SO_2 concentration the kinetics, and in particular the lag phase, were different between the *T. delbrueckii* strains. When the SO_2 concentration increased, the lag phase increased in the same manner for both *T. delbrueckii* and *S. cerevisiae*.

There was a clear intraspecific variability within the *T. delbrueckii* species for this parameter. The results show that strain A is more resistant to SO_2 and begins fermentation faster than strains B and O. For the same SO_2 concentration, the lag phases of the various *T. delbrueckii* strains were

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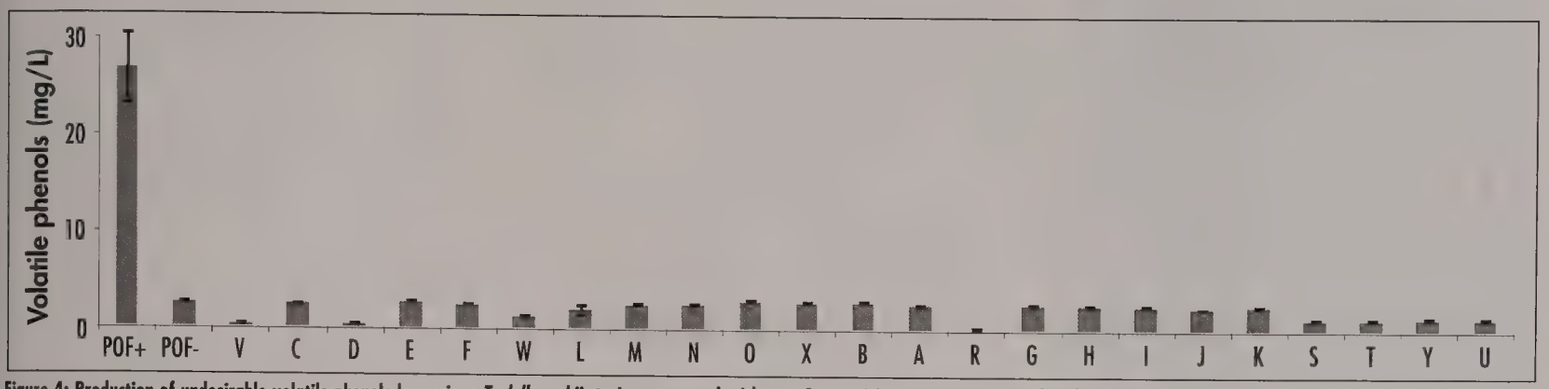

Figure 4: Production of undesirable volatile phenols by various *T. delbrueckii* strains, compared with two *S. cerevisiae* strains: a POF+ (phenolic off-flavor positive) and a POF- (phenolic off-flavor negative) strain, Zymaflore VL1.

longer than the one for the control *S. cerevisiae* (Zymaflore ST). *T. delbrueckii* appears, nevertheless, to have good resistance/viability to SO_2 and can begin fermentation in the presence of relatively high SO_2 concentration.

An essential point with respect to industrial selection is the fact that the various *T. delbrueckii* strains tested are not sensitive to the killer toxin K2 produced by many *S. cerevisiae* strains, and themselves cannot produce this toxin, thus providing an inherent compatibility with *S. cerevisiae* species.

Mixed yeast cultures of *T. delbrueckii* and *S. cerevisiae*

With maximum ethanol production by the *T. delbrueckii* species being lower than that of *S. cerevisiae*, resulting single-species fermentations were often incomplete. Thus, to be able to exploit the specific metabolisms of *T. delbrueckii*, *T. delbrueckii* strains must each be combined with a suitable *S. cerevisiae* strain in order to ensure complete fermentation and deliver a commercially viable wine.

Our study of the characterization of the species *T. delbrueckii* under enological conditions enabled us to select suitable strains adapted to red, rosé, dry white, and sweet wine production, in combination with selected *S. cerevisiae* strains. In this study, mixed yeast cultures were investigated by

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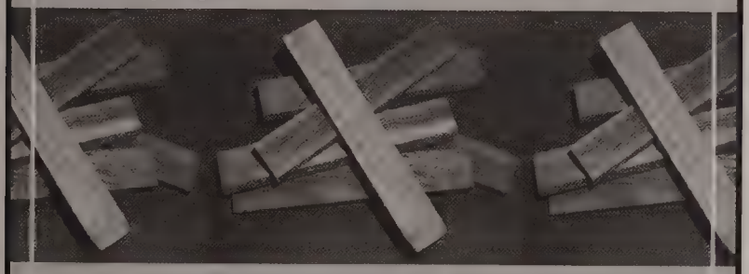

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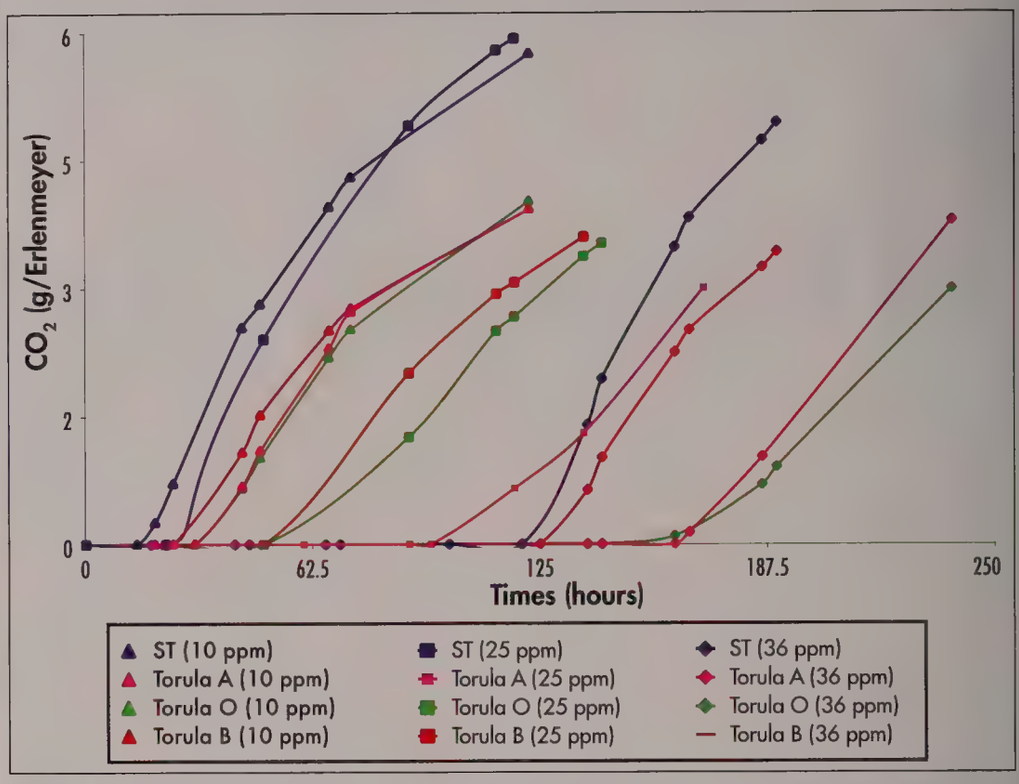

Figure 5: Fermentation kinetics (evolution of CO_2 release) of three *T. delbrueckii* strains and one *S. cerevisiae* strain (Zymaflore ST) in a synthetic medium with three ascending free SO_2 concentrations (10, 25, and 36 ppm corresponding to, respectively, 2, 43, and 75 ppm total SO_2).

sequential inoculation of the two species, where the *S. cerevisiae* strain was added after a specific *T. delbrueckii* strain (Zymaflore Alpha). In these experiments, the *S. cerevisiae* strain was introduced 24 to 72 hours after the *T. delbrueckii* (data not shown).

Below, results obtained from fermentations under cellar conditions on dry white, rosé, and sweet wines are presented. All fermentations were completed (defined as no residual sugar for dry wines, and 14% vol. ethanol achieved for sweet wines).

The presence of *T. delbrueckii* was confirmed in each case by PCR analysis, illustrating, in all cases, a positive implantation of this species. VA was decreased by up to 27% compared with the control (fermented with pure *S. cerevisiae*), depending on grape must and the *T. delbrueckii* strain used. The durations of fermentation were up to three days longer between the mixed culture experiments and the control.

The variation in length of fermentation observed was dependent on the particular strain of *T. delbrueckii* investigated. To illustrate the advantages of mixed *T. delbrueckii/S. cerevisiae* cultures, the results of three trials carried out during the 2009 and 2010 vintage (1 dry white, 1 rosé, and 1 sweet wine) are presented as case studies.

Case Study 1: Sauvignon Blanc Entre deux Mers (France)

The first trial was conducted on Sauvignon Blanc from Entre deux Mers (Bordeaux) against an *S. cerevisiae* control strain (Zymaflore X5). Fermentation kinetics of the pure *S. cerevisiae* fermentation and the mixed culture trial were similar, the latter taking one day longer (Figure 6). The aromatic analysis showed an increase in the production of seven major esters out of nine (Figure 7a). Stronger production of the varietal volatile thiols 3-mercaptohexanol (3MH) — grapefruit — and 3-mercaptohexyl acetate (3MHA) — black currant bud, passion fruit (Figure 7b) were observed.

This confirmed prior studies, which indicated that certain *T. delbrueckii* strains have strong thiol-release capacity for 3MH,[13] in contrast to its lower aptitude to release 4-methyl-4-mercaptopentan-2-one (4MMP) — boxwood, broom. In turn, this indicates a mechanism whereby wine style might easily be manipulated according to

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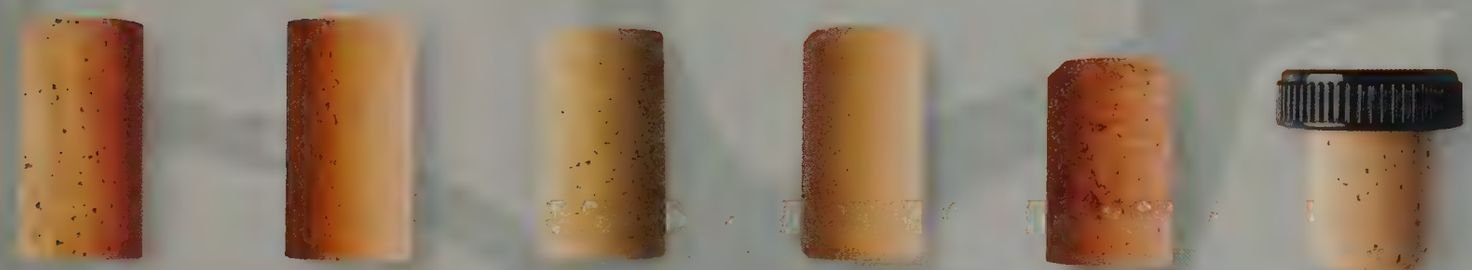

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market demands simply through a prudent choice of fermentation yeast.

Case Study 2: Merlot rosé, Entre deux Mers (France)

A Merlot rosé trial (Entre deux Mers, Bordeaux) allowed comparison of three *T. delbrueckii* strains by simultaneous inoculation with a commercial strain of *S. cerevisiae* (Zymaflore X16). Fermentation kinetics of the different trials were similar (data not shown), except those of *T. delbrueckii* S, which displayed faster kinetics (two-day fermentation advancement) compared with other trials and the control. The analysis of the aromatic compounds showed distinct profiles for the three mixed culture trials, distinct from the pure *S. cerevisiae* control (Figure 8).

Under these conditions, the mixed culture trials with *T. delbrueckii* A produced more phenylethanol (rose, floral), ethyl butyrate (pineapples, red fruit) and slightly more isoamyl acetate (banana) compared with the *S. cerevisiae* strain. The mixed culture with the *T. delbrueckii* S strain produced more phenylethanol, more ethyl decanoate (floral), and slightly less isoamyl acetate (banana). No significant differences for other fermentation esters from the control were observed.

The *T. delbrueckii* Q strain, which presented the fastest fermentation kinetics, produced fermentation esters at a level lower than or equal to *S. cerevisiae*, excepting ethyl butyrate (pineapple). The use of selected *T. delbrueckii* strains under conditions of simultaneous inoculation with *S. cerevisiae* thus appears to enable significant modification of the wine aromatic profile.

However, the intraspecific variability of *T. delbrueckii* previously noted was also found to extend to fermentation aroma production. Thus, the wine aromatic profile obtained from the combination of one specific *T. delbrueckii* strain with a *S. cerevisiae* may be far more appealing than that obtained with ~~a~~ another *T. delbrueckii* strain/*S. cerevisiae* combination.

One important qualitative character, noted during tasting, for wines made with the mixed *T. delbrueckii/S. cerevisiae* cultures, was greater volume and length on the palate. To date, the origin of this effect has not been elucidated.

Case Study 3: Sweet wines

A cellar trial was performed in the Sauternes appellation to study VA production in a sugar-rich Sémillon must (383 g/L; 22.8% potential alcohol), under real winemaking conditions (fermentation in new barrels) using mixed *T. delbrueckii/S. cerevisiae* cultures, and to compare aromatic impact by sensory analysis.

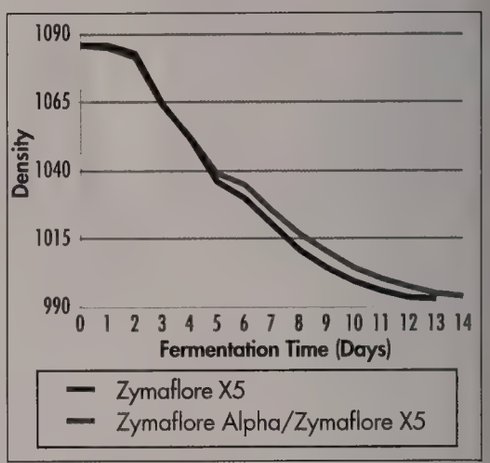

Figure 6: The fermentation kinetics of a Sauvignon Blanc from Entre deux Mers (Bordeaux) fermented using Zymaflore X5 and *T. delbrueckii* (Zymaflore Alpha).

Two trials were performed in parallel: a simultaneous inoculation of Zymaflore Alpha/Zymaflore ST and a second fermentation with only the *S. cerevisiae* Zymaflore ST. As in other trials, the presence of *T. delbrueckii* and *S. cerevisiae* was confirmed by PCR throughout fermentation. Fermentation kinetics of the two trials were similar (Figure 9). VA production kinetics were studied, showing a significantly lower final VA production for the mixed culture than with the pure *S. cerevisiae* culture (-27%).

A triangular test (by a panel of 25 experienced tasters) in this trial showed sig-

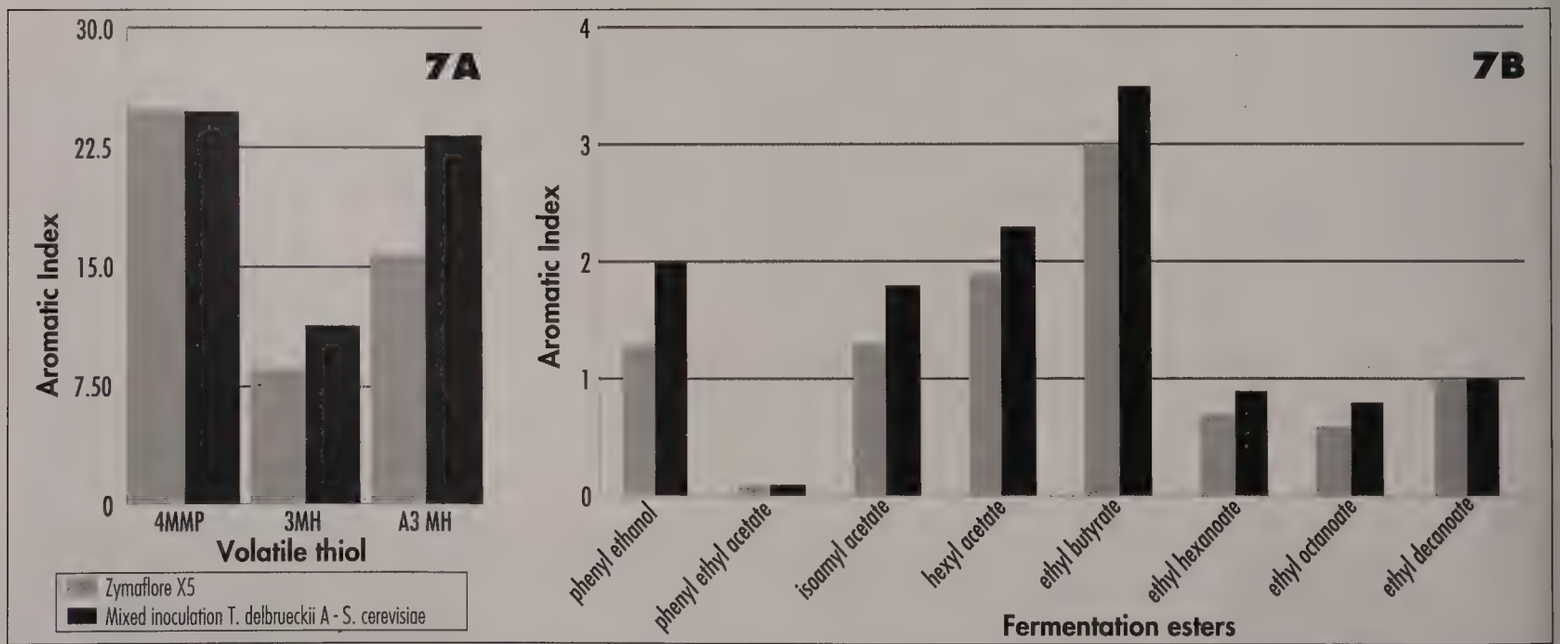

Figure 7: The aromatic analyses of three *T. delbrueckii* strains compared with a commercial strain of *S. cerevisiae* (Zymaflore X16). Isoamyl acetate = banana; ethyl butyrate = pineapple; ethyl hexanoate = apple; hexyl acetate = pear; ethyl octanoate, ethyl decanoate = floral; phenylethyl acetate = tea/rose; phenylethanol = rose. Aroma index = concentration relative to detection threshold, where a value greater than 1 indicates contribution to the aroma profile of the wine.

nificant differences between the wines resulting from mixed *T. delbrueckii/S. cerevisiae* cultures and the *S. cerevisiae* culture. Descriptive sensory analysis gave the following results: the wine resulting from mixed *T. delbrueckii/S. cerevisiae* cultures was perceived as being aromatically more complex, char-

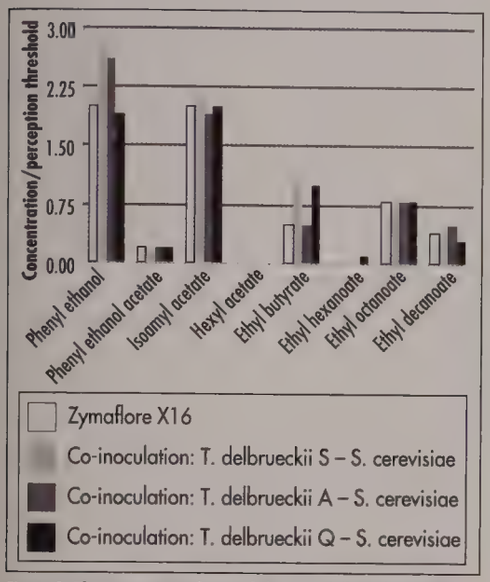

Figure 8: The aromatic analyses of three *T. delbrueckii* strains compared with a commercial strain of *S. cerevisiae* (Zymaflore X16). Isoamyl acetate = banana; ethyl butyrate = pineapple; ethyl hexanoate = apple; hexyl acetate = pear; ethyl octanoate, ethyl decanoate = floral; phenylethyl acetate = tea/rose; phenylethanol = rose. Aroma index = concentration relative to detection threshold, where a value greater than 1 indicates contribution to the aroma profile of the wine.

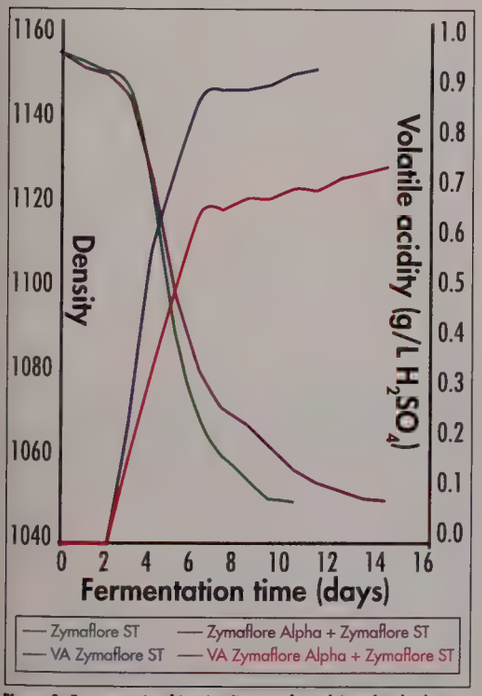

Figure 9: Fermentation kinetics (in new barrels) and volatile acidity production of a mixed Zymaflore Alpha/Zymaflore ST culture compared in parallel with only the *S. cerevisiae* Zymaflore ST strain.

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acterized by descriptors such as citrus fruits and freshness. At the gustatory level, a notable difference of mouthfeel with the mixed *T. delbrueckii/S. cerevisiae* culture was perceived.

In review, inoculating with a mixed *T. delbrueckii/S. cerevisiae* culture made it possible to obtain a more complex and rounded wine, with substantially lower VA level, and the resulting wine was subsequently used commercially in blends with traditional batches of pure *S. cerevisiae* wine.

Conclusion

The enological suitability of the non-*Saccharomyces Torulaspora delbrueckii* yeast was evaluated. Initially, strong phenotypical variability within this species was noted. Some *T. delbrueckii* strains enabled very low volatile acidity production during alcoholic fermentation. Moreover, *T. delbrueckii* is characterized by a low volatile phenol production, lower in fact than the low volatile phenol producing POF- *S. cerevisiae* Zymaflore VL1.

An investigation of the technological parameters lag phase, duration of fermentation, maximum ethanol production, SO_2-resistance, and sensitivity and production of the K2 toxin killer was used to screen for commercial suitability.

On the basis of the results obtained, the most superior *T. delbrueckii* strain for winemaking use in combination with *S. cerevisiae* was identified. Mixed cultures of the two species made it possible not only to ensure complete fermentations, but also to modify the aromatic complexity of wines and to increase palate volume and length.

In a subsequent article, the results of the combined fermentation of *T. delbrueckii* and *S. cerevisiae* in red wines will be presented. ■

Acknowledgements

The authors thank Châteaux Goudichaud, La Tour Blanche, and Cantegril for allowing the trials presented in this work to be conducted in commercial environments.

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TEMPORARY EMPLOYEES –

Most dangerous element in in cellar health and safety

BY **Robin Nicola,** Nicola Health and Safety, nicolahealthandsafety.com

Temporary employees help the wine industry all year round, but especially during grape harvest. These temporary employees assist the winemaking team with everything involved in processing incoming grapes to the cellar. These employees come from staffing agencies, wineries who hire them directly, and from national and international programs that supply young men and women called interns from abroad.

Temporary employees pose some of the greatest health and safety risks in the cellar. Many temporary employees have not received the health and safety training that full-time winery employees have completed earlier in the calendar year.

They may have language issues that can cause serious communication problems. They might not speak or read very well in either English or Spanish. Some interns come from countries in the world where wineries do not have any type of safety program in place. Unfortunately, some of them bring "bad safety habits" with them to work.

Temporary employee health/safety issues

The following list outlines the major issues affecting cellar health and safety for temporary employees:

1. Incomplete or no safety training on the dangers of cellar work.
2. They are not physically fit for the strenuous cellar work such as shoveling pomace in tanks, doing pump overs, walking up and down stairs, ladders, and catwalks.
3. Personal Protection Equipment (PPE) does not fit them correctly and they do not know how to use PPE correctly.
4. They may be frightened to tell their supervisors of an unsafe act or that they are working in an unsafe place for fear that they will be "let go" for causing problems.
5. Poor work ethic, sloppy work, cutting corners, taking the shorter, unsafe route to do a cellar job.
6. Some temporary employees get caught up in the "macho man or woman" mentality and believe they are physically invincible, which makes them very unsafe.
7. Many temporary employees show up to work wearing inappropriate clothing, jewelry, or footwear or with long, loose hair, and are unable to work in the winery in a safe manner.
8. If the winery does not have a "Pre-Employment Medical Exam" for all temporary employees they can bring their personal medical issues to the job during harvest, setting them up for illnesses and injuries, or even causing injuries to others on the cellar floor.
9. Some temporary employees come to work under the influence of legal and illegal drugs or alcohol.

Many times the full-time cellar employees have a poor attitude toward the temporary employees because they know they are only going to be there during harvest. They are not motivated to invest quality time concerning everything involved with health and safety on the job with these temporary employees.

Suggestions to build a temporary workforce that works safely in the cellar

1. Find and build a good working relationship with your local staffing agencies. Demand high-quality employees. Require the temps they send to be safety-trained before they come to your place of business.
2. Make sure your staffing agency understands what your health and safety expectations are before you begin receiving personnel from the agency. Ask the agency to show you what and how they train their people. Go to a training session to see for yourself what their program consists of.
3. Once the temporary workers or interns arrive at your winery, deliver a motivating, robust health and safety training program in a language they can understand before they begin their work. Their first day should be their health and safety training. Dress code, break times, company health and safety policies must be made crystal-clear the first day on the job. This process will set the tone of management's commitment to the new employees concerning their health and safety on the job.
4. Introduce the temporary to the full-time employees. Empower and

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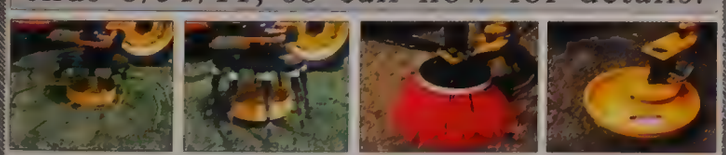
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train full-time employees to lead the health and safety "rules of the road" for new employees.

5. Upper management should lead the way for all employees in this area so that everyone understands the company's commitment to health and safety in the cellar.

6. Follow up by supervisors is necessary to keep the momentum during the busiest time of the year.

7. Fatigue is a serious factor for all workers and is a major cause of injuries and illnesses during harvest. Make sure breaks are taken and promote good eating and drinking habits at the work site.

8. Promote a team effort toward a healthy and safe workplace from all levels of the cellar department.

A workforce that feels all levels of management appreciates their efforts to work in a healthy and safe manner will produce some excellent wines and go home safely to their families here and abroad. Celebrate the diversity of the workforce and the health and safety of all who work at the winery. ■

Tell me, I forget.
Show me, I remember.
Involve me, I understand.
– Anonymous

Contact: Robin Nicola, Nicola Health and Safety, tel: 707-974-9258.

In Memoriam, Millie Howie

PWV Journal lost a valued contributor with the passing of wine industry veteran writer Millie Howie in April 2011.

Howie's career in wine began at Geyser Peak Winery (1971), with wine education and writing. Her Wine Words column originated in a Healdsburg, CA, newspaper in 1981, and she began writing for ***PWV Journal*** in the late 1980s. A champion of wine producers in Sonoma County, CA where she lived, Howie helped create the county's first wine map, and the Russian River Wine Road. Over almost 20 years, she helped found, support, and promote the Sonoma County Wine Library (Healdsburg) to become a premier source of wine industry information and history (containing 5,000 books, 40,000 articles, historical documents, journals, and viticulture texts today).

She wrote for numerous publications, including *Wine Country This Week, Wines & Vines, Wine West* and *PWV Journal*. Her work for *PWV* included winery case studies, regional wine reports, wine marketing information and highlights, wine industry legal and congressional efforts, successful tasting rooms, biographies of industry veterans, and packaging. Her knowledge of this industry was vast, her passion for wine was boundless, and her writing talent, undeniable.

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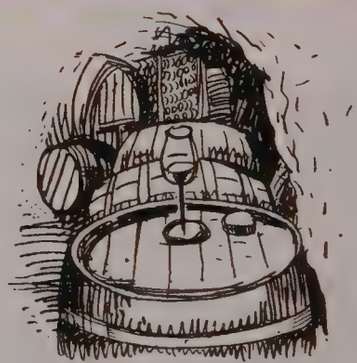
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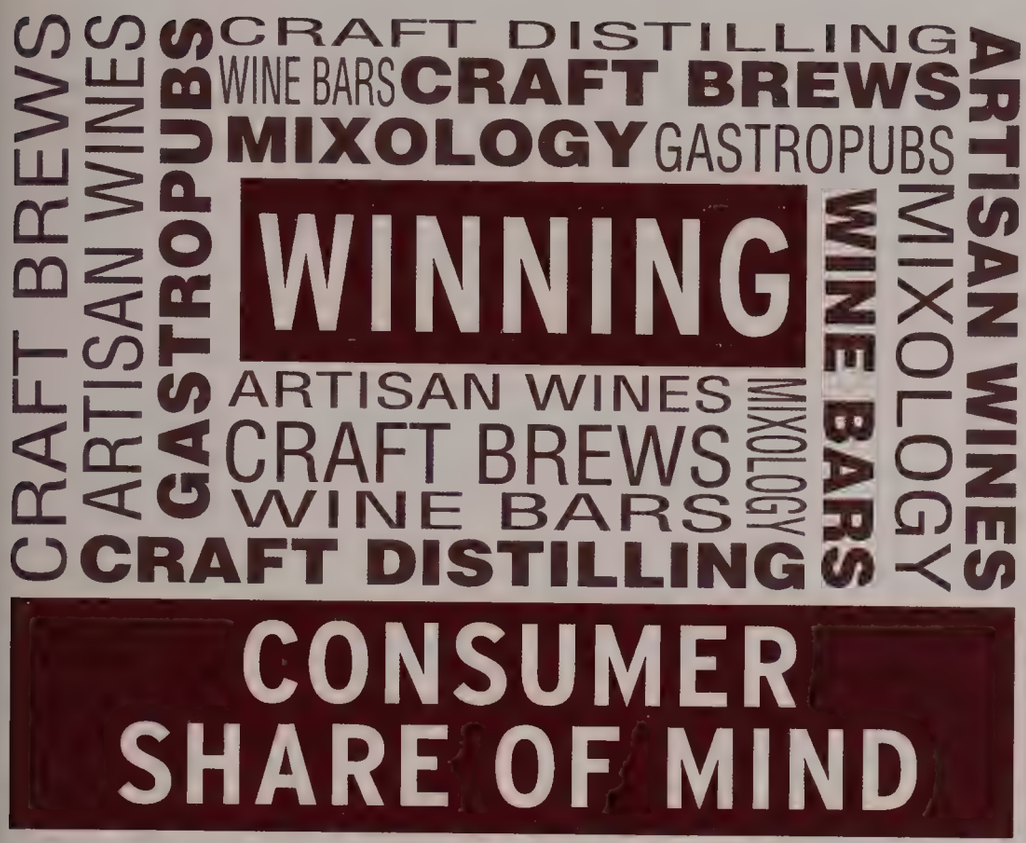

BY Deborah Steinthal, Scion Advisors, Napa, CA

Food and beverage producers have new opportunities to win consumer share of mind thanks to the New American Food Movement. From pantry to plate, many everyday consumers are acting increasingly like professional cooks, with more sophisticated ingredients, products, and tools at their disposal.

Food has become a form of self-expression much like a fabulous pair of fashionable shoes, or anything vintage. Just as the label "fashionista" evokes an entire lifestyle, so, too, does the term "foodie." The terms are not mutually exclusive, of course.

These passionate foodies are looking to build authentic relationships with their favorite food and beverage products through new physical and virtual social outlets. This means that producers are finding new ways to reach consumers.

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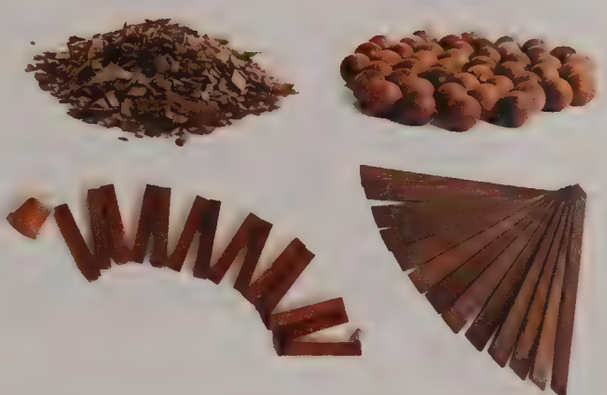

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Porkie (www.youtube.com/user/samphireshop). These guys know how to build community and tell their "locally grown" story. There are untapped new opportunities to strategic-partner with other brands to win consumer share of mind. American Express' Pairings' Channel is a great example of how integrated marketing among strategic partners builds a community that reaches passionate consumers (www.youtube. com/americanexpress/). One such Pairings' offer to AMEX fans, Three Masters - One Night, includes: Chef John Besh's new cookbook, wines from Genevieve Janssens at Mondavi and tickets to a Dave Matthews concert. The wine is purchased through the AMEX wine club and AMEX is the only way you can purchase tickets for a Dave Matthews concert. AMEX is where you can buy discount air and hotel to attend these events. It is building community and relationships.

What are you doing to win consumer share of mind through your direct and retail sales strategies? In this post-recession era, specialty food and beverage producers have a lot more global competition than before and will need to put together more thoughtful plans to build better differentiated, more profitable, and sustainable businesses. The good news is you have more resources available to differentiate your products and brands so you can be more successful with a consumer looking for your wares.

Scion Advisors is helping food and beverage producers develop integrated go-to market strategies, and plans that leverage these new market trends to drive consumer awareness and sales.

10 trends to follow

Here are TEN fast-growing new trends to consider as you build your sales and marketing programs this summer:

1. **Gastropubs** – Every major city is now host to this hybrid breed of pub, which mixes a wide selection of often-artisanal beers and spirits with high-quality house-made comfort food and a casual, community-oriented atmosphere. (Check out: Where to Go Next: Gastropubs, www.foodandwine.com/articles/where-to-go-next-gastropubs).

2. **Craft Brews** – Cask ales from craft brewers are now offering limited releases and are being aged in cellars in restaurants like wine. Restaurants are beginning to pair specialty cask beers with menus in one of the least known but rapidly growing areas of interest in beverage right now. Especially popular are the Belgian beers and lambics, both at retail and on-premise. Seasonal offerings are at an all-time high in popularity, fueling the locavore movement.

3. **Wine Bars** – It is being said, "Wine bars are the coffee bars of the 21st century." Starbucks took this trend literally (see Why Starbucks' Wine-Bar Attitude Works, www.bnet.com/blog/retail-stores/why-starbucks-8217-new-wine-bar-attitude-works/1752). Wine

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CO-CHAIR: MACK SCHWING • MSCHWING@SONIC.NET • (707) 570-2397

COORDINATION: WINE SYMPOSIUM GROUP • EVENTS@WINESYMPOSIUM.COM • (707) 255-9222

FOR MORE INFORMATION ON REGISTRATION AND SPONSORSHIP, PLEASE VISIT

WWW.GREENWINESUMMIT.COM

Bar concepts are exploding around the country with multiple bottle lists, themes (such as only South African, Italian, California, or Estonian-based wine lists), large numbers of wines by the glass.

Fifty to 100 offerings are quite common in many new wine bars. Themes that get people's attention from "Oak or Stainless" Chardonnays, to "Funky Reds" are popping up on lists to get consumers to have fun while they are getting educated. The same trend is hitting beer and teas.

4. **Artisan Wines** – Reminiscent of Europe, all 50 states produce wine today in the U.S., and as quality levels continue to improve, we are seeing more local wines on lists in urban markets, and more demand to have wines consumed locally that have a lower carbon footprint. Sommeliers are encouraging trials with tastes and local farmer ingredient-driven menus for pairing.

Wine is becoming more approachable and less stuffy, with high-end wine in keg showing up in many restaurants. Consumers are becoming less dependent on traditional influences, as key influencers such as Robert Parker retire and alternative rating systems become more robust, such as Cellartracker.com or the many Top 100 Wine Forums that keep cropping up. Social media and bloggers are making it easy for consumers to talk about their favorite wines and lifestyle around wine.

5. **Mixology** – Seasonality in ingredients is not just for the menu any more. Seasonal farmer's market-based cocktails are exploding on the scene in the world of mixology. Urban mixologists are championing small spirits producers across the country, creating a market and demand completely unexpected. New specialized content sites are helping to propagate this movement (check out www.Liquor.com).

6. **Craft Distilling** – From the Blue

Continued on page 91

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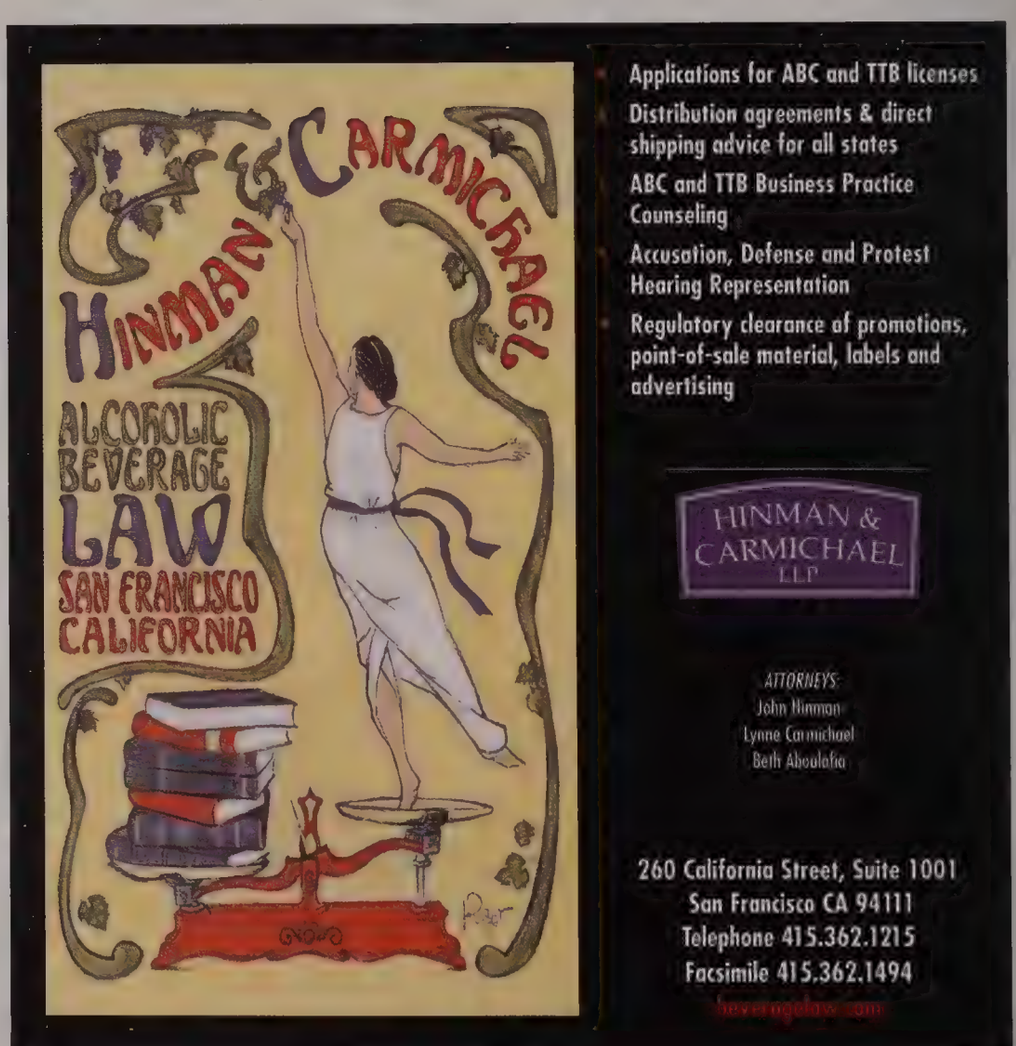

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PRACTICAL Winery & Vineyard JOURNAL

SUMMER 2011

WINEMAKING SUPPLIES SHOWCASE

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BEVERAGE SUPPLY GROUP

Beverage Supply Group (BSG), offering products and technical support services to the commercial wine industry, has acquired Crosby & Baker Ltd, a major wholesaler of home wine and beer making products in the U.S., with a warehouse in Atlanta, GA.

Beverage Supply Group

BSG is the licensed producer of **Superfood®**, the gold standard of nutrient blends. Developed by Lisa Van de Water, this original formula and ingredient QC is carefully monitored and controlled. All nutrients, including Vitamix®, Supervit®, Leucofood™, come with personalized technical support.

BSG is the distributor for **Phyterra™ yeast** , the NO hydrogen sulfide producing yeast during fermentation. This innovative technology developed by Dr. Linda Bisson (UC Davis) is very promising.

The cost-effective and efficient frozen MLF bacteria **Oenos®** (Oeno cups), has been well-received and provides a much-needed alternative to costly, direct-addition formulas.

Oak Alternatives – the development of liquid oak tannins by Toasted Oak Co. offers winemakers a range of options for finishing a wine. Ask for a sample of the **Liquid Oak Tannins**.

Filtration media – with the addition of **Doug Manning,** winemaker and bottling/packaging expert to its sales staff, BSG is offering **Graver** and **Filtrox** membrane and depth filters.

Most products, and technical support information are available online at www.BSGwine.com.

For more information, contact:

Beverage Supply Group
403 Gateway Rd West, Napa, CA 94558
tel: 800/585-5562
e-mail: sbrent@rahr.com
Doug Manning:
tel: 707/256-9891; e-mail: dmannihg@rahr.com
website: www.bsgwine.com

PLEASE SEE BEVERAGE SUPPLY GROUP ADS, PAGE 78, 107.

NADALIE USA

Nadalie USA has provided American, French, and Hungarian oak products since 1980, bringing French know-how and heritage to Napa Valley.

From the tree to the barrel – Nadalie USA's tradition is mastering the whole manufacturing process from tree selection to the final product. The company has stave mills in the U.S. and France for all American and French oak products. The wood is in the company stave yard for a minimum of two years.

NADALIÉ
TONNELLERIE

Nadalie, USA provides world-recognized French oak barrels from Tonnellerie Nadalie in Bordeaux France and from Tonnellerie Marsannay, in Burgundy.

TONNELLERIE
MARSANNAY
Burgundy

From the same rigorous oak tree selection as its barrels, Nadalie produces Oak Add Ins adjuncts, with more than 20 years of experience in this range of products, Nadalie oak fire-toasts all Oak Add Ins, and offers high-quality adjuncts for winemaking needs. Nadalie offers fermentation (mixture) and aging products for barrels (cubes, dominoes, oak chains, barrel inserts) and for tanks (tank staves, wine woods). All are available in French or American Oak.

For more information, contact:

Nadalie, USA/Tonnellerie Francaise
1401 Tubbs Ln., Calistoga, CA 94515
tel: 707/942-9301; fax: 707/942-5037
e-mail: info@nadalie.com
website: www.nadalie-usa.com

PLEASE SEE NADALIE AD, PAGE 19.

ST. PATRICK'S OF TEXAS

Winemaking supplies carried by St. Patrick's include:

- Membrane cartridge filters and filter housings;
- Filter sheets;
- Valves and fittings.

St. Patrick's of Texas

For more information and on-line ordering, please contact:

St. Patrick's of Texas
1828 Fleischer Dr., Austin, TX 78728
tel: 512/989-9727; fax: 512/989-8982
e-mail: stpats@bga.com
website: www.stpats.com

PLEASE SEE ST. PATRICK'S OF TEXAS AD, PAGE 99.

ETS LABORATORIES

ETS Laboratories has grown and evolved with the wine industry by pursuing a commitment to provide analytical services tailored specifically to the industry's very unique needs.

ETS clients now have the ability to:

- View real-time ETS Laboratories report data, with enhanced search and filtering tools;
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For more information, contact:

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899 Adams St., Ste A, St. Helena, CA 94574
tel: 707/963-4806; fax: 707/963-1054
e-mail: info@etslabs.com
website: www.etslabs.com

ETS Laboratories (Healdsburg, CA)
190 Foss Creek Cir., Ste G,
Healdsburg, CA 95448
tel: 707/433-7051; fax: 707/433-7054
e-mail: infohb@etslabs.com

ETS Laboratories (Roseburg, OR)
1400 Umpqua College Rd., Roseburg, OR 97470
tel: 541/440-7882; fax: 541/440-7883
e-mail: inforb@etslabs.com

ETS Laboratories (McMinnville, OR)
1819 NE Baker St., McMinnville, OR 97128
tel: 503/472-5149; fax: 503/217-0668
e-mail: infoor@etslabs.com

ETS Laboratories (Walla Walla, WA)
3020 Isaacs Ave., Walla Walla, WA 99362
tel: 509/524-5182; fax: 509/526-8053
e-mail: infowa@etslabs.com

PLEASE SEE ETS LABORATORIES AD, PAGE 27.

PICKERING WINERY SUPPLY

Pickering Winery Supply (PWS) distributes oak adjuncts from Suber-Lefort of Adelaide, Australia, which has 20 years' experience in turning French barrel-quality oak into tank planks, barrel inserts, mini-staves, chips, flakes, and powder. It is the unique toasting regimens and seasoning of the oak that result in flavor profiles quite distinct from any others. Suber-Lefort produces oak products for fermentation (powder and fine chips), maturation (tank staves, mini-staves and blocks), and finishing (micro-staves, segments), where aromatics take precedence over tannins.

PWS distributes a special fining agent produced in Germany, Vinpur Special, based on casein. It offers a gentle way to remove astringency, brown pigments, and oxidized phenols in red and white wines. What makes it unique is that it uses cellulose as a carrier, giving the casein a larger surface area and making it disperse much more completely. The result is a powder that can be directly added to a wine and is very predictable, unlike regular casein. Many wineries consider Vinpur Special an integral part of their winemaking.

For more information, contact:

Pickering Winery Supply
888 Post St, San Francisco, CA 94109
tel: 415/474-1588; fax: 415/474-1617
e-mail: info@winerystuff.com
website: www.winerystuff.com

PLEASE SEE PICKERING AD, PAGE 71.

3M PURIFICATION

3M Purification (formerly CUNO) is a world leader in the design and manufacturing of a comprehensive line of filtration products and systems for the clarification and final filtration of fine wines.

Innovative 3M Purification products for wine filtration include the first dual-zone clarification depth filter cartridge (Zeta Plus™ MH Series), the first integral multi-zoned membrane prefilter (LifeASSURE™ BLA series), and the first nylon-based final membrane filter optimized for repetitive hot water exposure (LifeASSURE BA series).

3M Purification also offers the LifeASSURE BNA series of final membrane filters. These final filters combine three innovative technologies from 3M to significantly improve filter throughput and reduce operating costs. A highly asymmetric microporous membrane, a specialized pleating design, and a novel support layer construction, deliver ultra-fast flow rates, secure spoilage organism retention, and remarkable throughput.

With close to 100 years of experience and manufacturing facilities on five continents, 3M Purification is uniquely suited to provide solutions to wineries worldwide.

For more information, contact:

3M Purification Inc.
400 Research Pkwy, Meriden, CT 06450
tel: 800/243-6894; fax 203/630-4530
e-mail: cjohara@mmm.com
website: www.cuno.com

PLEASE SEE 3M PURIFICATION AD, PAGE 19.

OAK SOLUTIONS GROUP

Oak Solutions Group is a premium oak products company providing expert advice, niche products, and unparalleled selection.

ēvOAK sets the standard for oak alternatives with innovations in design, toasting, and packaging of the finest French and American oak. ēvOAK products eliminate guesswork while offering the precise flavors winemakers are looking for:

- **ēvOAK Classic** tank staves are created with an industry-leading monitoring system, ensuring repeatable, consistent flavors. **High Extract** staves are ideal for blending and deliver concentrated, singular flavor profiles to suit specific needs. **Latitude 44° Bordeaux, 45° Rhone,** and **46° Burgundy** staves apply a modern approach to long-term aging to give certain varieties finesse and elegance. French for *blend,* **Cuvée** staves are formulated for winemakers looking for flavor characteristics such as macaroon, coconut, and toasted marshmallow.
- **ēvOAK** oak chips and powder feature prime oak selection, seasoning, innovative toasting, and unmatched quality control.
- **ēnoCUBES** are a combination of carefully-selected oak cubes (white and red fermentation blends, aging blends, and finishing blends) for each enological stage.

trū/tan gallo and ellagic-tannins, Oak Solution Group's newest introductions, are blends created using oak directly sourced from the same premium forest regions as fine French oak barrels, blended into three formulas: f^2 Fermentation Finishing, vf Vinification, and rf Reserve Formula.

Sample kits are available.

For more information, contact:
Oak Solutions Group
Paul Abbott, Oak Solutions Specialist
2557 Napa Valley Corp. Dr., Ste. D,
Napa, CA 94558
tel: 707/259-4988; fax: 707/255-5952
e-mail: pabbott@oaksolutionsgroup.com
Kyle Sullivan, Oak Solutions Specialist
tel: 707/287-8555; fax: 707/255-5952
e-mail: ksullivan@oaksolutionsgroup.com
website: oaksolutionsgroup.com

NAPA FERMENTATION SUPPLIES

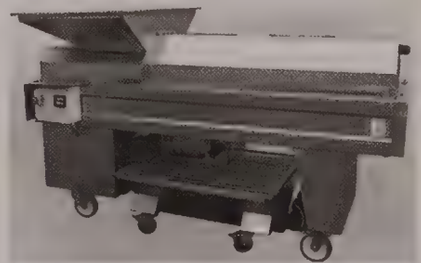
New for 2011: Napa Fermentation Supplies will now be a distributor of Enartis Vinquiry, Lalvin, Enoferm, Laffort, and Phyterra yeast and winemaking products.

Napa Fermentation has an array of winemaking supplies, including:

- Winemaking kits and ingredients;
- Wine yeast, nutrients, and malolactic cultures;
- Stoppers, bungs, spigots, wine hose, tubing;
- Labware, refractometers, and chemicals;
- Wine thieves;
- Oak products;
- Fermentation locks, buckets, and fermentors.

Napa Fermentation offers 54 strains of wine yeast and enzyme products. Malolactic bacteria include: Chr. Hansen Viniflora Oenos, Chr. Hansen CH 16, and Chr. Hansen CH35. Yeast nutrients include Fermaid K and Super Food.

There is a full line of Zambelli winemaking equipment including crushers (up to 14 tons per hour), membrane presses, electric hydraulic presses, bladder presses, bottle fillers, auto corkers, pressure-sensitive labelers, plate filters, cooling units, pumps for light must, stainless steel fittings, and cam locks.



Napa Fermentation carries the Tivoli corking/filling machine (AISI-304 stainless steel), with four jaws for use with synthetic or natural corks with 22, 24, or 26mm diameter. Stainless steel fittings, and Karcher hot and cold pressure-washers are available.

For more information, contact:
Napa Fermentation Supplies
575 Third St., Bldg. A
(Inside the Napa Town & Country Fairgrounds)
PO Box 5839, Napa, CA 94581
tel: 707/255-6372; fax: 707/255-6462
e-mail: wineyes@aol.com
website: www.napafermentation.com
PLEASE SEE NAPA FERMENTATION AD, PAGE 29.

VTI-VALTRONICS, INC.

Valtronics offers a variety of carbon dioxide (CO_2) sensors for monitoring worker safety during the fermentation process. Sensors can be used in barrel cellars, storage tanks, bottling rooms, winery pits, and sumps.

The **new Valtronics Model 2011** features include:

- Complete self-contained, handheld, and portable;
- Low cost and high quality;
- Non-dispersive infrared (NDIR) technology;
- Digital display with audible alarm.

VTI Valtronics, Inc.

For more information contact:
VTI-Valtronics, Inc.
3463 Double Springs Rd.,
Valley Springs, CA 95252
tel: 209/754-0707; fax: 209/754-0104
e-mail: vti@val-tronics.com
website: www.val-tronics.com
PLEASE SEE VALTRONICS AD, PAGE 39.

XTRAOAK

XTRAOAK has provided the highest quality French and American oak alternatives for fine wine to winemakers for nearly 30 years, with time-tested production efforts using these essential parameters:

- Cooperage grade selection of wood;
- Natural, open-air seasoning;
- Consistent convection toasting;
- HACCP Process and traceability;
- Research and Development;
- Innovation for ease of use and better complexity;
- Technical expertise.

XTRAOAK's wide range of innovative products helps winemakers with all aspects of the winemaking process. For white and red wines, and for fermentation or aging, XTRAOAK offers seven products: Chips, Granular, Barrel Inserts, "Oak-on-a-Rope", Xoakers, Fan Assembly, and "Stavettes."

In addition to traditional light, medium, and medium plus toastings, XTRAOAK has developed five unique "toast blends" for Barrels Inserts, Fan Assembly and Oak-on-a-Rope products. The proprietary toast blends offer complex flavors and aromas, ranging from the bright minerality of lighter toasts, to the spicy, caramelized sweetness of darker toasts.

XTRAOAK can advise winemakers on these five new blends with specific flavor profiles: French Naturelle Series, French Clair, French Roti, American Spectrum, and American Bold.

For more information contact:
XTRAOAK
5803 Skylane Blvd. Ste. C,
Windsor, CA 95492
tel: 707/836-9742; fax: 707/836-9759
website:www.xtraoak.com
www.store.xtraoak.com

PLEASE SEE XTRAOAK AD, PAGE 79.

CANTON COOPERAGE

Canton Cooperage is focused on offering the highest quality American oak barrels, which are available for white wine fermentation.

Canton barrels are produced by:

- Selecting high quality American oak;
- Naturally open-air seasoning the staves up to 48 months (certified);
- Toasting the barrels precisely, with computerized monitoring;
- Using the latest technology of cooper's craft in a modern facility;
- Applying HACCP process; full traceability and food safety controls (certified);
- Developing new techniques based on R&D with cooperage partner Tonnellerie Taransaud;
- Improving performance for sustainability development.

For white wine fermentation, the Canton Grand Cru barrel's 3- and 4-year seasonings are used in many premium programs for Chardonnay, Sauvignon Blanc, and other international white varietals. These barrels contribute a refined balance of sweetness, light spices, minerality, and subtle floral notes.

CANTON
Grand Cru
NATURALLY SEASONED 4 YEAR WOOD

Grand Cru barrels, available in 225L, 228L, 265L, 300L and 500L, will enhance structure, add volume and depth to the middle palate, and lengthen the finish of fine wines. These barrels are recommended for vinification in wood, and extended aging on the lies for white wines.

For more information, contact:
Canton Cooperage
5803 Skylane Blvd. Ste C Windsor, CA 95492
tel: 707/836-9742; fax: 707/836-9759
website: www.cantoncooperage.com

PLEASE SEE CANTON COOPERAGE AD, PAGE 29.

LAFFORT USA, INC.

LAFFORT USA distributes a range of LAFFORT products directly in the U.S., with a team of experts including three former winemakers as Technical Sales Support – David Douglas, Jillian Johnson-Phoenix, and Russell Robbins, and a Technical Manager (Dr. Peter Salamone).

LAFFORT
l'œnologie par nature

LAFFORT introduces a new non-*Saccharomyces* yeast from the *Torulaspora delbrueckii* species, **Zymaflore Alpha**, chosen from the largest collection of *Torulaspora* yeasts. Extensive research of its characteristics (See page 68), indicates the yeast brings increased aromatic complexity and significant mouthfeel, with outstanding resistance to osmotic pressure for sweet wine production with lower VA. **Zymaflore Alpha** is available in 500g; Laffort recommends sequential inoculation of *Saccharomyces cerevisiae* to complete fermentation.

Nutristart OrganiQ is an organic nutrient, naturally rich in vitamins and minerals. It is a very complete nutrition for the yeast, respecting the balance of amino acids/mineralized nitrogen in grapes. Addition is recommended at one-third of the way through AF.

Nobile Barrel Refresh is specially designed to extend the life of oak barrels. It slowly diffuses over time, characteristics of Nobile oak staves, to enhance integrated oak notes in wine.

BIOLEES, QUERTANIN products, Zymaflore FX10 and F15, VL3 and X5, DYNASTART, Lafase HE GRAND CRU, Tanin VR SUPRA, GECOLL SUPRA, and STABIVIN SP are other LAFFORT products available.

For more information, contact:
Laffort USA, Inc.
tel: 707/343-1632
e-mail: charlotte.gourraud@laffort.com; laffortusa@laffort.com
website: www.laffort.com;
www.laffort.com/usa

PLEASE SEE LAFFORT AD, PAGE 75.

SCOTT LABORATORIES INC.

Lallemand yeast strain Vitilevure 3001® was isolated, studied, and selected from the prestigious Côte de Nuits in Burgundy during a three-year research project. The goal of this selection program was to find a dominant natural yeast strain from a traditional "cold soak" that would elaborate intense, complex, and balanced Pinot Noir varietal character. The 3001 strain stood out from other strains. Wines made with it were noted for fruit and varietal characters that were both elegant and complex.

Enoferm V22® *Lactobacillus plantarum* malolactic bacteria strain was selected during a study by the Università Cattolica Sacro Cuore di Piacenza in Italy. *Lactobacillus plantarum* is classified as a facultative heterofermenter; therefore it does not produce volatile acidity by metabolizing glucose and fructose. It shows a positive organoleptic impact on high alcohol/high pH red wines.

Scott'Tan proprietary tannins were introduced to the wine industry in harvest 2010. Developed specifically for North American winemakers, the enological tannin range includes six fermentation tannins (including a 100% grape skin tannin), and five cellaring and finishing tannins.

Scott Laboratories features its range of OMRI-certified organic products including yeast nutrient Fermaid O, yeast rehydration nutrients GoFerm and GoFerm Protect, and yeast derivative nutrients Noblesse, Opti-Red, and Opti-White.

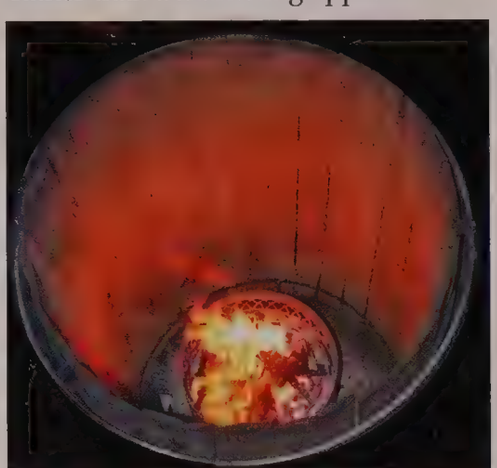
Scott Labs has a satellite location at 190 Foss Creek Circle, Suite G, in Healdsburg, CA for convenient pick-up of fermentation and filtration products.

For more information, please contact:
Scott Laboratories, Inc.
PO Box 4559, Petaluma, CA 94955
tel: 707/765-6666; fax: 707/765-6674
e-mail: info@scottlab.com
website: www.scottlab.com

PLEASE SEE SCOTT LABS AD, PAGE 40, 58.

STAVIN INCORPORATED

To replicate distinct profiles delivered by the world's finest cooperage, the StaVin research team has initiated a **barrel fingerprinting** project. **Barrel fingerprinting** integrates quantitative scientific analysis of barrel extractives, with qualitative sensory panels of leading winemakers. The application of analytical and sensory data to StaVin's traditional hand fire-toasting approach will enable StaVin to capture the essence of desired barrel profiles using StaVin products. StaVin selects oak with a winemaking approach rather than a marketing approach.



StaVin supplies French, American, and Hungarian oak products, including Savour oak, Tank Stave Fan Packs, StaVin Oak Beans and Stave Segments, the Barrel Replica, Traditional Barrel Insert, and Infusion Tube. StaVin recently introduced the "Barrel Head," a slightly heated oak product to blend with StaVin toasted products, adding richer mouthfeel and subtle nuances as tasted in only high-end barrels.

The paramount steps in StaVin's process to quality begin with careful quality control at every step, including three-year-plus seasoning of all oak staves, and finishing with meticulous hand fire-toasting programs.

For more information, contact:
StaVin Incorporated
Alan Sullivan, Steve Sullivan, Dr. Jeff McCord, Dr. Jeff Murrell, Jamie Zank
PO Box 1693, Sausalito, CA 94966
tel: 415/331-7849; fax: 415/331-0516
e-mail: info@stavin.com; website: stavin.com

PLEASE SEE STAVIN AD, PAGE 69.

LALLEMAND

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Gordon Specht: gspecht@lallemand.com,
Sigrid Gertsen-Briand: sigrid@lallemand.com,
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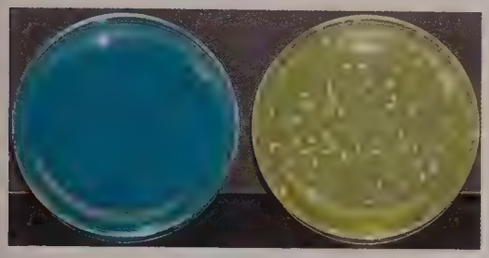
PLEASE SEE LALLEMAND AD, PAGE 80.

LEBRUN LABS

Lebrun Labs offers easy-to-use wine microbiology tests – testing plates and media for determining the presence of the wine spoilage yeast ***Brettanomyces***, total aerobic counts, total yeast/mold, and total bacteria.



The tests are packaged in the "Easy Blue" kit: a complete-do it-yourself kit with easy instructions. To use the Easy Blue kit, wine or juice is applied to a plate, pre-measured mixing beads are then applied, and the plate is shaken. After incubation, there will be a color change, a strong Band-aid odor (if the wine contains *Brettanomyces*), and the development of countable colonies that indicates the concentration of cells in the starting sample.

Lebrun Labs also offers its latest "Easy Sniff™" Brett test. The metabolism-based test specifically looks for the conversion of odorless p-coumaric acid to 4-ethylphenol (Band-aid odor). One winemaker described Easy Sniff as the "smell the future" test – because Easy Sniff indicates what the wine might smell like in six months if the Brett problem develops further.

Lebrun Labs' state-of-the-art facility and experienced scientists are available to develop custom assays for wine testing. This includes immunoassays, DNA, and metabolism-based tests. Lebrun offers products that can be modified to winery specifications on an OEM basis. Contact Dr. Lebrun by email (stewart@lebrunlabs.com) to discuss a project.

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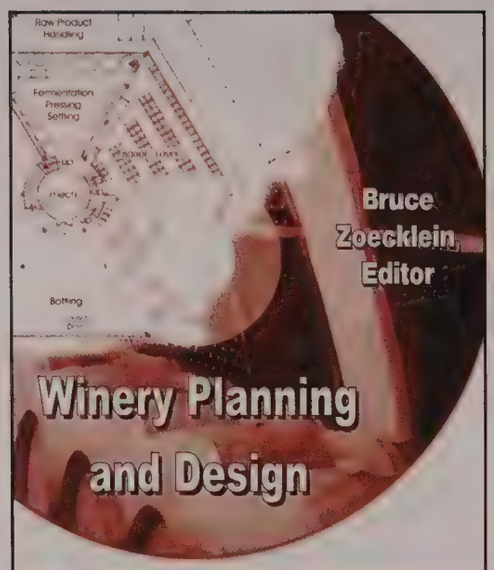

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VinOak USA

VinOak USA, division of Cork Supply Group, offers the popular "Rice" oak style for use in fermentation for Harvest 2011. The versatile product has proven effective in enhancing color retention, and in reducing "vegetal" aromas, often associated with particular vineyard blocks, or with higher crop yields.

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Enartis Vinquiry, part of the Esseco Group, a world leader in the production of winemaking products, offers Enartis fermentation and specialty winemaking products, along with labware and chemicals. Product highlights for 2011 include:

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PLEASE SEE ENARTIS VINQUIRY AD, PAGE 7.

Consumer share of mind

Continued from page 82

Ridge Mountains to the San Francisco Bay Area, mom and pop distilleries are all the rage, with over 100 independent spirits producers in North America (up from five in 1990). Small-batch spirits appeal to consumers seeking diverse and unique flavors (check out Square One Organic Spirits at www.squareoneorganicspirits.com).

Obscure, once forgotten spirits and liqueurs — such as Absinthe, Crème de Violette, and Swedish Punch — are coming back due to high demand from the creative cocktailians mixing it up across the U.S.

7. **Natural Condiments, Preserved Foods, and Heirloom Produce** – These locally sourced and homegrown foods are made using traditional cultivation and preservation methods, bringing consumers closer to the sources of their food and appealing to eco-minded people seeking to go green. (Check out: the amazing Baker Creek Heirloom Seeds catalogue at www.rareseeds.com).

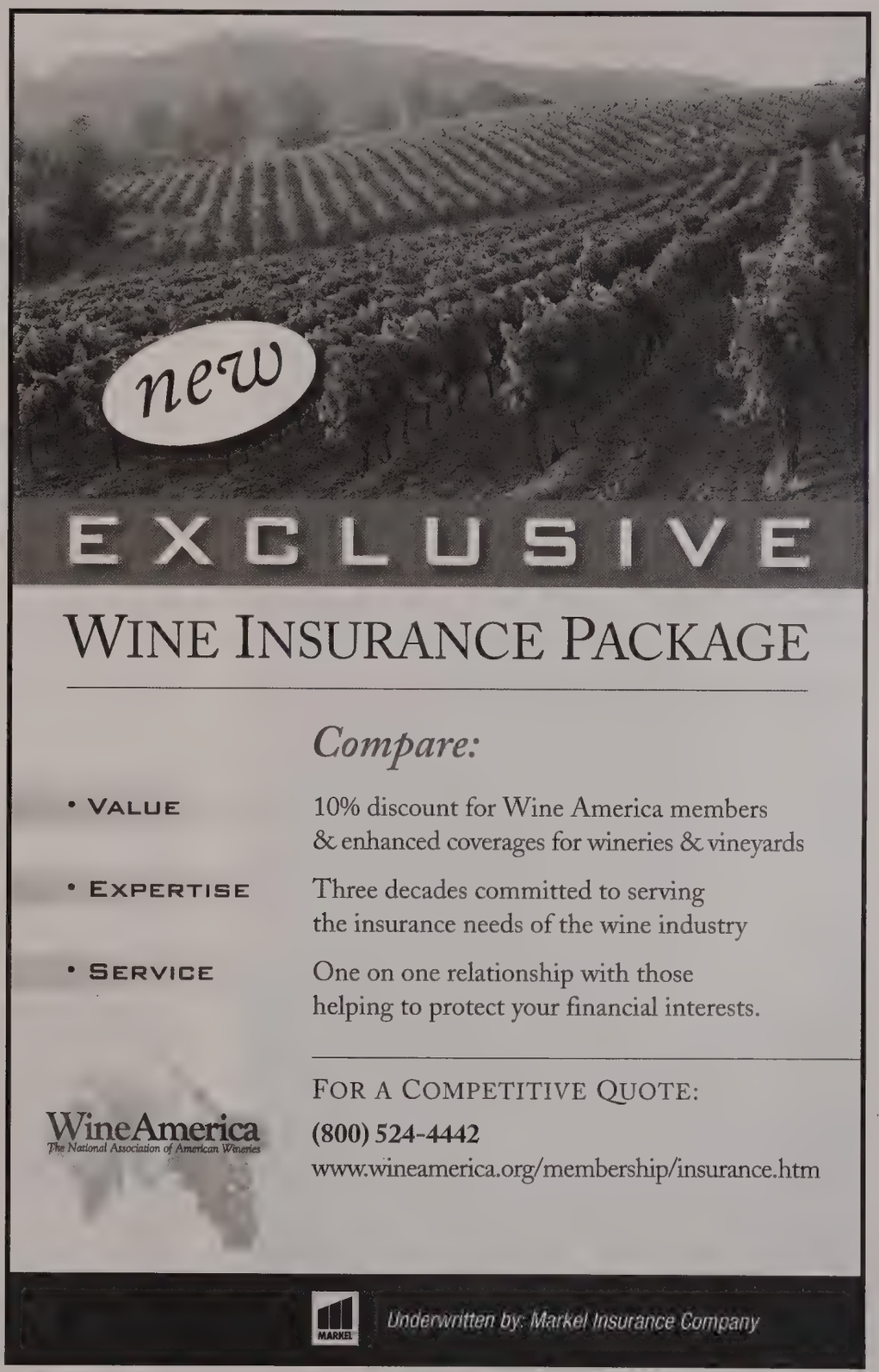
For people on the go, getting nutrients and energy boosts is a global phenomenon, as high-quality, certified organic, raw, kosher, superfoods such as Goji berries and raw cacao are made more available. (Check out: Navitas Natural at www.navitasnaturals.com).

8. **Handmade Ice Creams, Gelatos, and Sorbets** – Using old-fashioned methods and organic and local ingredients, new American ice cream innovators offer extraordinary ranges of flavors of a familiar favorite. (Check out: sorbet "category maker" Ciao Bella, www.ciaobellagelato.com).

9. **"Safe" Butchery, Charcuterie, and Fish** – "Rock star butchers" are raising interest in meat, hosting meat cutting classes and demonstrations while placing an emphasis on locally sourced and heritage options. (Check out: Chef Bertolli's Fra'Mani at www.framani.com or Clean Fish at www.cleanfish.com).

10. **Traditional Eastern Teas Meet West** – Tea sommeliers are working the floors of tea salons in urban areas. Teas are showing up in cocktail infusions and in hot toddies. Ready-to-drink teas are more popular than ever with all sorts of healthful flavorings from green tea to ginger, to pomegranate, to white and red teas. Chefs are cooking with tea for savory and sweet items on the menu. (Check out: Mighty Leaf Tea at www.mightyleaf.com, Guayaki at www.guayaki.com, and Republic of Tea at www.republicoftea.com). ■

The author is principal at Scion Advisors, a business and strategy consulting firm. She can be reached at 707.246.6830, or email Deborah@ScionAdvisors.com.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SMART VITICULTURE *by Dr. Richard Smart*

In defense of conventional viticulture

Viticulture the world over is under some form of not-so-subtle attack. Wine production methods that favor so-called "organic" approaches are being praised by the wine press, to the detriment of what I might call "conventional" viticulture. The strong inference from some journalists is that so-called "biodynamic wines" are better than so-called "organic wines," and both are better than wines grown from fruit in "conventional" vineyards.

But, what evidence is there for this viewpoint? Are we seeing yet another myth being created here? There are already too many myths in the wine sector — do we need another?

Do we have any evidence that wines produced by such "organic" methods are superior in quality? If so, such information may be of benefit to consumers, and journalists may help by mentioning production methods. Or is it that the producers using organic methods deserve consumer support for their supposed environmental concerns? Maybe, but I doubt that consumers are really concerned about vineyard environment claims.

Again we have unproven assertions that such methods actually do protect the vineyard environment. Many so-called "organic" vineyards I see just appear to be poorly managed, and full of weeds and suffering water and nutrient stress. Is this good for the environment? I doubt it, surely not good for the vines, and fruit, and wine quality! Gladly, I have never seen any journalist promoting wines from so-called "organic" vines as being more healthy for consumers. That would indeed be an extravagant assertion, and one that would cause many wine producers a great deal of anxiety.

Many grape and wine producers the world over are feeling pressure to switch production methods, to cash in on the perceived marketing bonus for "organic," even though they may consider their present production systems as "environmentally friendly" or "sustainable."

Some definitions

We might define vineyard production systems as being either "conventional" or "alternative," the latter synonymous with the generic concept of "organic."

CONVENTIONAL VITICULTURE uses synthetic and/or manufactured fertilizers and pesticides in a manner determined by Government regulation, at least for pesticides. A typical conventional vineyard in the U.S., Australia, and New Zealand would be drip-irrigated, use herbicides to create a bare under-vine strip, and with a tractor-row cover crop that may be sown or volunteer species. The vineyard is typically farmed to avoid severe stress such as from pest, diseases, or drought.

Pesticide use is often reduced using Integrated Pest Management and also weather station-based disease modelling. Conventional viticulture is the most common the world over, though in some regions cultivation replaces herbicide use, as in parts of South America and Europe.

A little-known modification to conventional viticulture is being developed by Steve Wratten of Lincoln College and his group in Waipara, New Zealand (see http://bioprotection.org.nz/greening-waipara). This holistic approach is called "greening conventional" or "environmentally sensitive" viticulture. This is a science-based program to use natural protection in the vineyard to reduce pests and diseases.

Selected flowering crops are used to attract specific insect predators of pests and diseases, and also mulches to encourage a breakdown of vine debris on the soil and reduce Botrytis primary infection. In my opinion this approach deserves much more recognition.

ALTERNATIVE SYSTEMS emphasize the vineyard ecosystem. Such an approach typically encourages biological diversity in the vineyard, and concern for "soil health" is common. Some proponents of alternative systems believe that they are a pathway to improving wine quality, but this assertion is often a statement of faith, not a proven reality.

There are several forms of alternative viticulture. One of the "softest" is called **integrated production** in Europe, or **sustainable production** elsewhere including Australia. This system was developed in Europe, especially Switzerland, and has since spread to Oregon in the U.S., then to New Zealand and South Africa, and finally to Australia.

There are now many well-known systems of "sustainable" viticulture in the U.S., listed at http://winegrapes.tamu.edu/grow/sustainablevitic.html. These include California Sustainable Winegrowing Alliance and programs at Lodi

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Woodbridge, Central Coast, and Napa in **California**, and also in Washington, New York, and Oregon. The sustainable viticulture concept seeks an integrated approach to long-term grape production with concern for the environment, society-at-large, and economic viability of vineyard operations.

The basic aims of integrated production are to minimize applications of manufactured chemicals, and to avoid those impacting the environment, and also to emphasize soil care. In New Zealand, sustainable viticulture is defined as: "winegrowing practices that are economically viable, socially responsible, and environmentally sound." Several countries such as New Zealand have developed protocols for sustainable winegrowing and an inspection and certification process.

ORGANIC VITICULTURE is a term used widely in the Western world, but other terms include **ecological viticulture** in Germany and **biological viticulture** in Switzerland. This viticultural production system is more restrictive regarding pest and disease control. No synthetic chemicals are used apart from limited amounts of copper (as Bordeaux mixture) and sulfur as fungicides. Herbal preparations are often used to "strengthen" the grapevine.

There are several organizations within each country that will provide certification of organic status, including California Certified Organic Farmers (CCOF) — see www.ccof.org/about.php. "Organic" viticulture is not necessarily science-based. By the way, is the opposite of an "organic" vineyard, an "inorganic" one?

BIODYNAMIC VITICULTURE is based on guidelines of the German philosopher Rudolf Steiner. It is the most extreme and ideological of all approaches, and might even be considered spiritual; it is certainly not based on science or biology. The soil is regarded as an integral part of symbiosis between planet, air, and cosmos. Biodynamic farmers may plan their activities according to the position of the moon and stars, and time of year.

While Bordeaux mixture and sulfur are permitted fungicides, other agrochemicals and fertilizers are absolutely forbidden. Three main biodynamic viticultural preparations are dung compost for the soil, horn dung for the roots, and horn silica to assist photosynthesis. This system is often ridiculed as being non-scientific, but its proponents include a few world-famous producers. This system appears to be the darling of many wine journalists. There is only one organization certifying biodynamic producers: Demeter — see www.demeter-usa.org/.

What is in a name?

My question is whether the use of such terms will help sell more wine, or even increase the enjoyment of consumers. Organic wine for instance, can carry logos of the group providing organic certification, and there may be several of these in each country. More confusion for the consumer?

Sustainable viticulture is not a widely understood concept, and yet it is the system of choice being promoted in the U.S., New Zealand, South Africa, and now Australia. In fact, as of 2010, only wines from "sustainable" registered producers will be eligible for entry into Air New Zealand wine

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awards. There was a recent wine column with the heading "What the hell are sustainable wines?" They are obviously not so well-known as are "organic" and "biodynamic."

We have yet another apparent grouping of winegrowers, at least in Marlborough, New Zealand. A group of five wineries have joined under the banner MANA (Marlborough Natural Winegrowers) with a goal to "produce the best wines possible." All members practice organics "to improve wine quality" and "for environmental reasons." So we may have to contend with the new label of "natural winegrower" – what are the rest of us, un-natural?

How safe is conventional viticulture?

We live in a chemophobic world where there is much bad press against the use of chemicals in all aspects of our lives. Thus, there is this seemingly beneficial aspect to alternative viticulture so far as the vineyard environment is concerned. But is this the truth? Are such approaches truly beneficial to the environment? Is conventional viticulture so damaging to the environment?

There is considerable government regulation in the use of agricultural chemicals in Australia, as in other Western countries. In Australia, this is administered by the Australian Pesticides and Veterinary Medicines Authority (APVMA), which controls a registration scheme for agricultural and veterinary chemicals. This scheme registers and regulates the manufacture and supply of all pesticides and veterinary medicines used in Australia, up to the point of wholesale sale.

In California, similar functions are the responsibility of the California Department of Pesticide Regulation — see www.cdpr.ca.gov/. The stated mission statement is: "Our mission is to protect human health and the environment by regulating pesticide sales and use, and by fostering reduced-risk pest management." Does that not sound like an "organic" producers association mission statement?

Before being registered for sale, products must go through a risk assessment process. Companies requesting registration must provide product information to allow independent evaluators to decide whether it is effective and safe for people, animals, and the environment, and is not a trade risk.

We should ask ourselves whether alternative viticulture has such a well-organized and regulated set of procedures to guarantee human health and environmental security. I emphasize that this approach is science-based, and this is not always the case in alternative viticulture and especially not biodynamic viticulture.

Would you feel safe if the regulatory authorities used the belief systems of biodynamics to support regulations designed to protect our food and environment? Or fly on an airliner designed by Rudolf Steiner?

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Are vineyards damaging to the environment?

There are surprisingly few studies of this topic. Such studies are easy to make — one can compare the physical, chemical, and biological environment within the vineyard, for example, with undisturbed vegetation nearby.

A recent University of California study compared soil properties in native oak woodland with that in a vineyard. There were differences in physical, chemical, and microbial properties. Vineyard soils have higher bulk densities both at the surface and even at more than one meter in depth. There were also differences in carbon distribution.

Compared with the oak woodland, vineyard soils were depleted in carbon throughout the measured profile, but more evenly distributed. This may be due to the introduction of fresh carbon sources into the deeper soil during soil ripping through establishment. Microbial biomass carbon was higher in the woodland in the upper six inches of soil; however, below this depth, the vineyard soils had similar amounts of microbial biomass carbon. The levels decreased with depth in both soils.

A study of vineyard soil health has been conducted in

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Marlborough, New Zealand. Researchers sampled 26 vineyard blocks and almost 200 individual sites in Marlborough, at soil depths 0 to 6 inches and 6 to 12 inches. Samples were collected at several sites within the vineyard and also in the headlands.

Vineyard establishment caused a significant decrease in carbon parameters such as organic carbon, microbial biomass, and basal respiration within the first few years of vineyard establishment. There was a greater effect on the surface soil than deeper. However, the more significant differences were in the soil physical properties of macro porosity and bulk density. These changes apparently happen more quickly than those for organic carbon and microbial biomass.

A long-term study of organic amendments to vineyards in the Loire Valley [France] carried out over 28 years showed that crushed vine prunings were preferable to mushroom compost and cow manure as soil organic matter additions. The latter in particular had negative effects on the environment, vine growth, yield, and wine quality. Yet, it is preferred in "organic" viticulture. What can one say?

The only instance I have seen of vineyard pesticides causing problems was in acidic soils of the Graves region, near Bordeaux. Here over 100 years of application of Bordeaux mixture had caused copper toxicity, which killed the vines. This is paradoxical, because Bordeaux mixture is regarded as acceptable by organic growers, whereas most conventional growers use manufactured forms of copper.

What can we conclude from this? The situation is confusing, and the popular wine press can be accused of promoting myths. Conventional, science-based viticulture is on the back foot, and its proponents are made to feel varying degrees of discomfort, as though they are some sort of "environmental vandal." This is not right nor appropriate, and the organic mythology needs to be challenged, by good science.

It seems to me that the best agent causing most environmental degradation in a vineyard is the person driving a tractor on wet soils, hence causing compaction. This is reinforced by the above studies. One thing that seems apparent is that there should be more emphasis on retaining and even increasing soil carbon in our vineyard management.

What of the future?

I think these issues are so pressing as to require some action on behalf of the majority of producers in the wine sector. There are several steps that can be taken. First, some serious research could be conducted on the environment of vineyards with different management systems. This should include chemical analysis of soil for chemical residues, to see if the soil is being contaminated.

Second, controlled experiments should look at impacts on wine quality, and also production costs. These are issues that research funding bodies need to consider.

I have visited many so-called organic and biodynamic vineyards around the world. Often they are conspicuous in the viticultural landscape, showing gross nutrient and water stress. I was particularly impressed with the appearance of such vineyards on a trip to New Zealand in the autumn of 2010. A modicum of water stress is known to improve potential wine quality, but severe water stress will not. Further, nitrogen deficiency, which is common in so-called "organic vineyards," is known to reduce the quality of Sauvignon Blanc and Pinot Noir wines.

I am a firm believer in maintaining and improving the vineyard environment. I do not think that one has to be "alternative" to have an interest in the vineyard environment. If we can reduce the use of sprays by natural means, I am all for it. As such, I am a proponent of disease- resistant vines, bring them on! I really like the "ecosystem services" as proposed by Steve Wratten, using natural predation. It is science-based and "organic" in approach.

I think that there should be more promotion about just how well-regulated and sustainably- conducted is conventional viticulture. I see no reason why the scientific approach, which is used to assure protection of the environment and human health with conventional viticulture, should be given up so easily to non-scientific and unjustified criticism. There is no way Rudolf Steiner's science could put a man on the moon. Should we trust this non-science with the safety of our foodstuffs and the environment? What do you think?

Finally, let me say that I do not have issues with people managing their vineyards "organically" or "biodynamically" — that is their choice. My concern is that such systems are, in my opinion, over-promoted, inferring benefits to wine quality, the environment, and maybe consumer health. For my part, I would like to see these benefits proven. ■

WINEMAKING

Successful malolactic fermentation

Continued from page 64

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LETTER TO THE EDITOR

To Dr. Richard Smart:

As a long-term subscriber to *Practical Winery & Vineyard Journal* I have always looked forward to the regular features of Dr. Richard Smart. *Sunlight Into Wine* was a landmark contribution to viticulture.

I have a small 2-acre commerical vineyard in east Texas. As you may know, humid regions with warmer winters are vulnerable to Pierce's disease, so I grow a hybrid grape called Blanc Du Bois that is tolerant to PD. It makes a very nice white wine with unique flavor and aroma characteristics. Hybrid grapes are somewhat challenged by more well-known vinifera cultivars in the marketplace, but I am hoping it will continue to grow from a local favorite into wider acceptance.

Blanc Du Bois is a very vigorous cultivar, my soil is well-drained and sandy, which encourages more vigor, so I have benefitted greatly from your research in canopy management. I use a Geneva Double Curtain trellis system, employing the "Big Vine" concept.

I was surprised and disappointed to read Dr. Smart's column "Reducing CO_2 – the REAL pollutant" in the Spring 2011 ***PWV Journal.*** As an environmental scientist and engineer, I am particularly attuned to the use of the word "pollutant." I have spent my professional career dealing with real pollution, so when I see CO_2 – an essential and beneficial substance in our environment – so characterized, I am compelled to respond.

As we both know – or should know – carbon dioxide is plant food. Other nutrients are needed, but CO_2 is a plant's only food, it cannot survive without it. Carbon dioxide – replenished through the carbon cycle – is the source of the carbon utilized to produce carbohydrates through photosynthesis. Without plants of course, we animals could not survive.

Dr. Smart, with all due respect to his contributions to viticulture is, I believe mistaken in assuming that added CO_2 will cause an enhancement of the greenhouse effect, leading to a dangerous increase in earth's temperature, (global warming). While this opinion is widely proclaimed among climate alarmists, it is exactly that, an opinion. ***There is no empirical evidence whatsoever that CO_2 recently caused, or will, in the future, cause global warming of any significance. None.***

Information supporting the manmade global warming theory is largely based upon a short term historical correlation between CO_2 and temperature, and computer models. These computer models have a poor record in forecasting (or even hindcasting) climate events. Empirical evidence - not failed computer models — supports a climate that is driven by natural processes (solar cycles, ocean oscillations, orbital dynamics, and longer term, continental positioning from geological plate tectonics). Examples of these ocean dynamic patterns include the ENSO (El Nino/Southern Oscillation), PDO (Pacific Decadal Oscillation), AO (Arctic Oscillation), and others.

Models are intellectually interesting, but kind of useless unless they can actually predict with some accuracy. The success record of climate modeling has been terrible! As a

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scientist and engineer I place much greater reliance upon empirical evidence.

In his column Dr. Smart states, "The majority of the world's climate scientists agree that recent evidence of global warming can be linked to increasing atmospheric CO_2 levels, increasing largely because of human activity."

FACT: Over 700 internationally recognized scientists provided testimony to the U.S. Senate **refuting** the theory of manmade global warming (U.S. Senate Minority Report on Global Warming, March 16, 2009.) Good science is not done by polls, nevertheless no credible survey of scientist's positions has ever been conducted.

It is a well-documented fact that more carbon dioxide in the atmosphere increases the efficiency of plant growth. As we burn fossil fuels and increase the trace levels of atmospheric CO_2, our agriculture flourishes and produces more food with less water. (See *The Many Benefits of Atmospheric CO_2 Enrichment*, Drs. Craig and Sherwood Idso, 2011, Vales Lake Publishing, LLC).

We in the wine industry face many challenges, not the least is access to affordable and reliable energy. We should not be wasting scarce resources on popular theories that lack solid empirical evidence.

You are a respected scientist in viticulture who has made major contributions in this field of study. I hate to see you associated with a point of view that is largely ideology-driven rather than hard science. Making the changes demanded by climate alarmists will be very expensive, and under those circumstances the evidence supporting it should be compelling. It is at best unproven, and at worst, the greatest hoax of this century.

My sincere advice: please continue your good work in the vineyard and leave the dubious climate change issue alone.

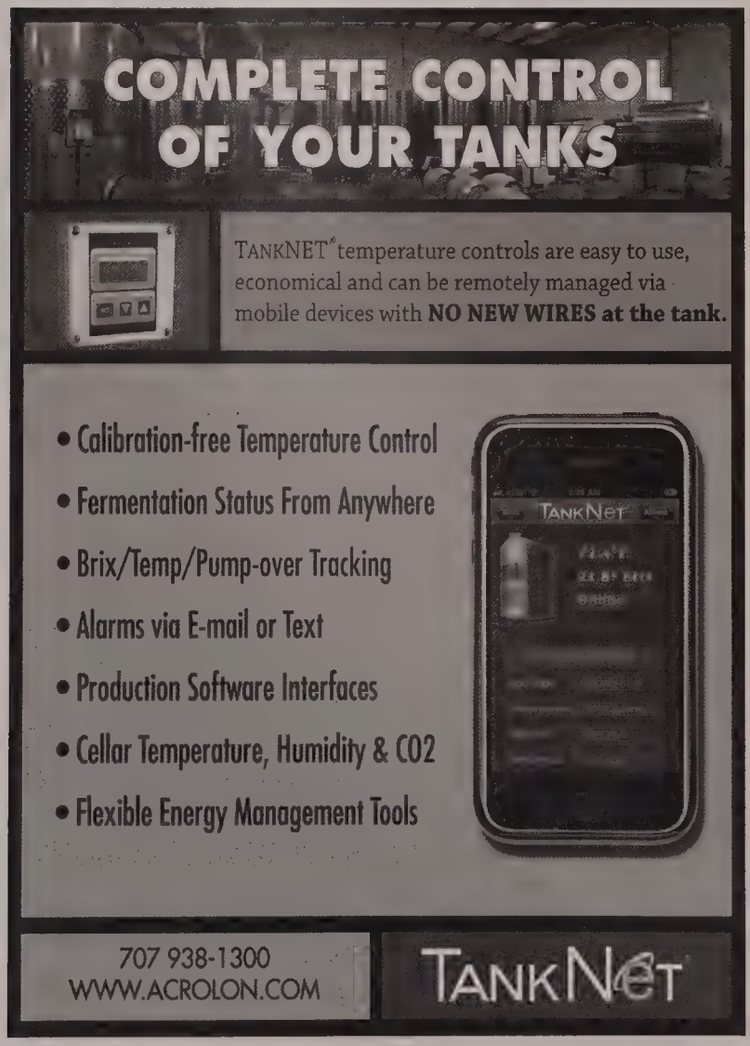
Robert P. Smith, Ph.D., P.E.
***Pine Plantation Vineyard**, Dallas, Texas*

EDITOR'S REPLY

Hello Robert Smith,

I am grateful for your response. But for your letter this important issue may have fallen into the oblivion of all other previously written, previously read columns in *PWV*. I think the issue is really important, and I suspect so do you.

First, thanks for the compliments on my column, but do not be apologetic that we have opposing opinions on climate change. I think it is a real threat, but you do not. That is fine, and I personally welcome contrary opinions. I always feel uncomfortable in a room full of people with a single opinion, be that opinion political, social, religious or scientific. You may be disappointed with my opinion, I am not with yours.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I can accept that you find my title "CO_2, the real pollutant" challenging, as an environmental scientist. How can we consider CO_2, an integral component of our world's biosphere, as polluting? Well, if atmospheric CO_2 levels contribute to global temperature increase, I can only think of it as a "pollutant." I concede that the meaning is different from our normal concept of "pollutants." In using this title, I admit to using the term emotively, with the aim of attracting the attention of a reading audience.

Dr. Smith, your opinion and mine on CO_2-induced climate change differs, and I will not debate that issue here. I do believe your opinion is of the minority, as do the majority of the world's climatologists according to what I read. It also is the case that governments around the world see fit to act on the issue to try and reduce carbon emissions. The Australian Government will introduce a carbon tax next year. I know of no government which is promoting carbon emissions because they are unconcerned about climate change.

In preparing my response to your letter I contacted several American scientific colleagues for their opinion. First, Greg Jones is a well-known climate scientist from Oregon, he pointed me to a Wikipedia article which presents several reviews of the extent of support by the scientific community about climate change, see: *http://en.wikipedia.org/wiki/Scientific_opinion_on_climate_change#Surveys_of_scientists_and_scientific_literature.* One article presented there says:

A 2010 paper in the ***Proceedings of the National Academy of Sciences of the United States*** reviewed publication and citation data for 1,372 climate researchers and resulted in two following conclusions:

i) 97% – 98% of the climate researchers most actively publishing in the field support the tenets of ACC (Anthropogenic Climate Change) outlined by the Intergovernmental Panel on Climate Change, and

ii) the relative climate expertise and scientific prominence of the researchers unconvinced of ACC are substantially below that of the convinced researchers.[104]

Second, I contacted David Smart (no relation) of the Department of Enology & Viticulture at UC Davis. He notes that in parts of the continental U.S. (such as California), this has become a regulatory issue, and many states are following California's lead. On June 26, 2006, the California Legislature passed Assembly Bill 32, The California Global Warming Solutions Act. This legislation calls for all sectors (transportation, manufacturing, AND agriculture) to reduce greenhouse gas emissions to 1993 levels by 2020. The California Air Resources Board is the agency responsible for implementing a plan to regulate emissions.

On December 7, 2009, the U.S. Environmental Protection Agency (Federal) declared an "endangerment finding" for greenhouse gases (CO_2, CH_4, and N_2O). This requires

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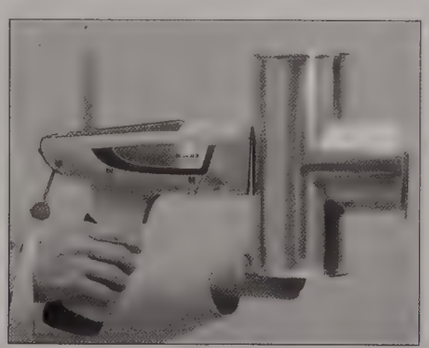
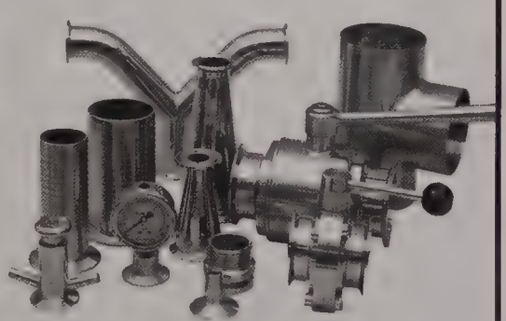
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California, for example, to regulate green house gas emissions according to the California Clean Air Act. Dr. David Smart notes that the major issue here is that substantial (tons of) CO_2 is released to the atmosphere when forests and other systems like grasslands are converted to vineyards. California counties (like Napa County) are required to develop Climate Action Plans to meet the greenhouse gas emissions goals set by the above-mentioned legislative actions.

New vineyard development is being reviewed and mitigation practices for lessening emissions during establishment are being discussed to discover how to restrict CO_2 emissions during vineyard development. Although these actions might be seen as impediments to business development, none of us really wants to see the adverse effects of climate change and its impact on our environment.

David Smart also directed me to this excellent publication: *www.sustainablewinegrowing.org/docs/CSWA%20GHG%20Report_Final.pdf.* This publication investigates the role of vineyards in greenhouse gas emissions and how vineyards may be managed to be more efficient in this regard.

I am sure we will see, over the coming years, increasing concern with vineyard management and carbon sequestration.

Last but not least I contacted Dr. Roger Boulton (also of UC Davis). Roger and I have discussed on several occasions CO_2 emissions from wineries, and Roger is of the opinion that for wineries to claim they are carbon neutral then they should not ignore loss of CO_2 to the atmosphere from fermentation. Roger is developing concepts for a sustainable winery which includes CO_2 sequestration. Roger also forwarded this link to the EPA opinion on climate change: *http://epa.gov/climatechange/science/stateofknowledge.html.*

So Dr. Smith, I think the weight of evidence is against those who deny man's contribution to climate change. I further think that the grape and wine sector will be obliged to become increasingly concerned about our carbon footprint in the future.

I conclude on a more philosophical note. I am in my 60s and I have two children and three grandchildren. Whilst I accept there is already evidence of climate change in my lifetime, my concern is for my children's and more specifically my grandchildren's lifetime which I believe will be greatly impacted by climate change. Therefore I do what I can to raise the issue of climate change in the wine sector around the world. I believe I was one of the first to consider this issue and over the last several years I have been active in promoting my concerns both through publications and presentations.

I doubt, Dr. Smith, that we will agree on many of these issues, and thanks again for the opportunity to again present my viewpoint.

Regards, Richard Smart

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COMPLIANCE TRAINING *by Ann Reynolds, Wine Compliance Alliance*

Accessing real value in your compliance system

When looking at the wine business, its two most common images are the grapevines, where it all begins, and the finished bottled product. These two main components are essentially the beginning and the end of the process and then both very visible and recognizable.

But what about the activities that occur in between these two stages? I am referring to the activities after grapes arrive at a winery and proceed through various steps in the winemaking process until the finished product goes into the bottle.

Documentation of these steps are what make up the bulk of a winery's compliance system, and the tracking of those processes, though not nearly as recognizable, is certainly important. This documentation is required by the agencies that regulate the wine industry. On top of that, the data that lives in that documentation holds a wealth of very informative and useful information for wineries.

As a compliance expert who was schooled first-hand in the day-to-day reality of winery compliance, I now speak about the role and value of compliance in the winemaking process. That role is to keep track of the data and activities that make up the lives of their wines. Its value is in the details of all that data, which, if tracked properly, can be used to benefit a winery's business as a whole.

Both customers and members of the wine industry pay very close attention to the beginning and end parts of the process. Wines are written about and given ratings. Vineyards are meticulously cared for by their owners, are sought after as desired fruit sources, and have inspired many an artist to photograph or paint their images.

Compliance, on the other hand, generally receives most of its press only around topics related to challenges or problems. Some examples of these include issues related to licensing, ongoing regulation updates to either block or alter the shipment of wine, or what sorts of events a winery can or cannot conduct at their site.

Notice here again that all of these examples are focused on the peripheral areas of winemaking, not the actual day-to-day in the life of the wines. But it is in the details of the day-to-day winemaking activities where a wealth of data lives that wineries can access and use to assess, develop, and grow their business.

Some examples of this wealth of data are: blend breakdowns on their finished wines (variety, vintage, appellation, and vineyard percentages), barrel usage data, analysis histories, and details on addition material usage.

Examples of the data related to vineyards include comprehensive details on harvest totals by vineyard and by block, harvest analysis data, and harvest dates and tonnage details used for payment purposes. Other departments at wineries also stand to benefit from accessing the data tracked in their compliance systems.

Everyone from the owner and the CFO to the tasting room and marketing department has a potential interest in the data that is kept in their wine compliance records.

There are definite, specific steps that need to be followed in setting up a compliance tracking system in order for it to effectively provide that wealth of data.

Step one is to verify the current inventory in as much detail as possible. This involves identifying, for each individual lot of wine, the wine breakdown details (vintage, variety, appellation, and vineyard), the details of the vessel (or vessels) it is located in, and the total quantity.

The next step, once the inventory list is complete, is to load the data into whatever tracking system is to be used. The best tracking systems, which give their users the most thorough access to data, are database software programs. The use of these has increased dramatically in recent years as several of them have become available, and their overall popularity and reputation has reached a broad audience.

One of the most significant advantages of using a database is that it coaxes all of a winery's wine inventory and historical information onto one source. It is still very common for wineries that do not use a database for their wine tracking to instead have multiple versions of their data. This happens as a result of several winery staff people each keeping their own records on the same data.

For example, several people will have their own inventory list that they maintain on their computer. The question then arises, "Which is the real set of numbers?" Use of a database eliminates that, at least to a significant degree.

The next step in maintaining the database is to have regular documentation procedures in place for all winemaking activities. Some examples of documentation types include weight tags, bills of lading, and work orders. Anytime a winemaking activity occurs, documentation must accompany it.

This completed documentation is then passed over to the person(s) responsible for maintaining the database. They keep track of all these documentation records (in hardcopy form) and perform data entry and database upkeep, which ensures that all winery staff who may want to utilize the data contained in them have ready access to it.

Databases can be set up so any winery staff member with an interest in accessing the wine data can be given a basic user level that only allows them to look up data. This is a quality control measure of sorts in that only certain people are given a data-entry user level that enables them to enter or edit data.

The final two steps in the process are reporting and filing for label approvals. The same winery staff members responsible for maintaining the database are also often responsible for filing reports and label approvals. This is the most effective set up for a winery to follow as they are the winery staff most familiar with the data required to complete reports, as well as all the details related to qualifying for label use and label approvals.

As a side note, I would also mention that they are the winery staff most qualified to meet with TTB (Alcohol & Tobacco Tax & Trade Bureau) staff in the event of an audit.

Take another look at the stage in between the vineyard and the bottle. The gold mine of data living there tells the story of both, while providing everyone involved in the process with the data they are most interested in. Though the role that compliance plays in the winemaking process is generally a behind-the-scenes one, the value of the data collected should not be overlooked. ■

Contact Ann Reynolds via email, ann@winecompliancealliance.com.

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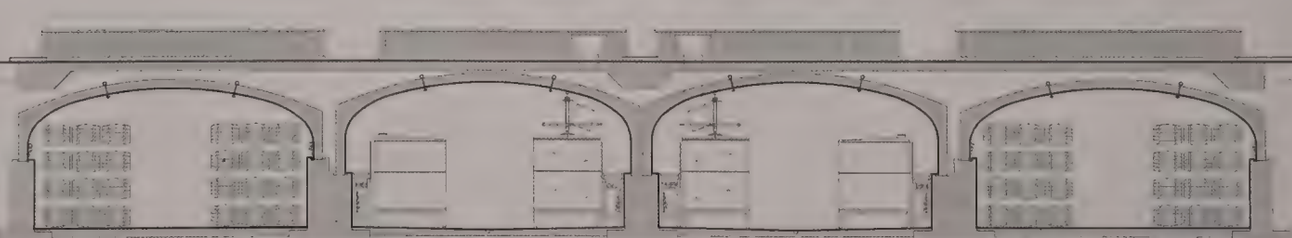

WHOLESALE ABUSE of the Constitution

BY Angela Logomasini, Director of Risk and Environmental Policy, Competitive Enterprise Institute, Washington, D.C.

Republican Congressman Jason Chaffez of Utah is leading the charge on federal alcohol legislation during the 112th Congress on behalf of the National Beer Wholesalers Association. Chaffez introduced H.R. 1161, the so-called "Community Alcohol Regulatory Effectiveness Act," which he says safeguards the constitutional principle of states' rights. In reality, Constitutional framer James Madison would be appalled by such claims.

The legislation is similar to the bill that Rep. William Delahunt (D-Mass., retired) introduced in 2010, which garnered more than 150 sponsors. Thus far, the Chaffez bill has 57 cosponsors.

H.R. 1161 would allow states to pass laws that impede commerce as long as they do not: "intentionally or facially discriminate against out-of-state or out-of-territory producers of alcoholic beverages in favor of in-state or in-territory producers unless the State or territory can demonstrate that the challenged law advances a legitimate local purpose that cannot be adequately served by reasonable nondiscriminatory alternatives."

Should H.R. 1161 be approved, the courts might allow states to impose discriminatory laws against out-of-state wineries, if the state can argue that the impact is not *intentionally* protectionist.

Some opponents contend that H.R. 1161 would allow states to discriminate against wineries with regulations that indirectly have protectionist effects, such as differential tax treatment.

Yet the bill's language barring intentional discrimination against producers would be hard for wholesalers to overcome. For example, the *Granholm v. Heald* opinion notes that the court had, in the past, ruled that differential tax treatment is not only unnecessary and discriminatory.

Wendell Lee (Wine Institute) noted a potential loophole on the ShipCompliant blog. The courts may decide that taxing out-of-state wines at higher rates does not discriminate against producers, per se. Instead it discriminates against their products. Since H.R. 1161 only grants protection to producers, out-of-state wineries would have no defense against discriminatory taxes and states would set these taxes so high that they would eliminate direct shipping. Whether the court would actually accept such logic is unknown, but it raises a frightful possibility.

There are a number of other protectionist state laws that H.R. 1161 might make valid. The jury is still out, for example, on state laws regulating which wineries may ship based on their volume of production – so called "volume caps."

In any case, the limited protections provided to producers in H.R. 1161 apply only to producers, allowing for an unbridled number of state-level protectionist policies affecting anyone else in the industry.

Such laws will undermine sales of any domestic winery or importer whose brands are marketed via online retailers. It might also prevent direct shipping from producers who rent winemaking facilities, because many states classify them as either retailers or distributors, rather than producers.

This blatantly unfair treatment may destroy many small entrepreneurial retailers, leaving fewer outlets through which wineries can reach consumers.

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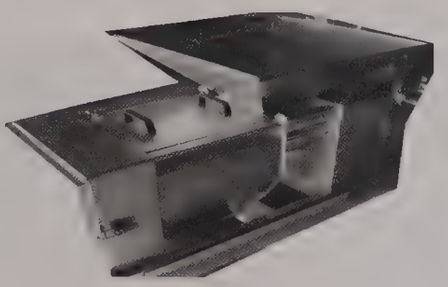

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to monopolize the alcohol market at the expense of other industry members and American consumers," notes Rep. Mike Thompson (CA-1), co-chair of the bipartisan, bicameral Congressional Wine Caucus.

The wholesalers' ultimate goal with such legislation is to limit the amount of wine and spirit sales that skip the wholesaler tier and deprive them of profits.

For example, states like California allow retailers to buy direct from wineries in-state and even outside the U.S. If California retailers are free to ship these wines to consumers around the nation, wholesalers do not earn profits from those sales.

By tying the hands of retailers and importers to ship interstate, wholesalers can block such competition. But the desire to avoid competition does not make a compelling political argument, which is why wholesalers claim to be guardians of the Constitution and states' rights.

The wholesalers' use of constitutional arguments is particularly ironic because James Madison specifically designed the Constitution to ward off such special-interest politics. In *Federalist Number 10*, Madison explained that the "principal task" of government is to control "factions" such as special-interest groups from trampling the rights of others.

Accordingly, Madison and the other framers advocated a form of government that would balance powers and employ checks and balances to limit opportunities for overbearing special interests to undermine liberty. The federal commerce power — which wholesalers want to overcome — is one of the many checks in the system. Madison argued in favor of this clause to facilitate the unfettered exchange of goods and services across state lines, a freedom critical to the nation's prosperity.

At the time, conflicts between the states — then joined in a relatively loose alliance under the Articles of Confederation — jeopardized both freedom and security. The goal was to form a stronger, more stable union, in which individuals could prosper in both liberty and security. The only issue remaining was the extent of federal power vis-à-vis the states.

Madison explained in *Federalist No. 45* that the powers reserved for the states would remain "numerous," and enumerated federal powers would be "few and defined." The commerce power — as embodied in the federal Commerce Clause — is among the few enumerated federal powers, but Madison did not think this one was all that controversial.

He further commented, "The regulation of Commerce, it is true, is a new power; but that seems to be an addition which few oppose and from which no apprehensions are entertained."

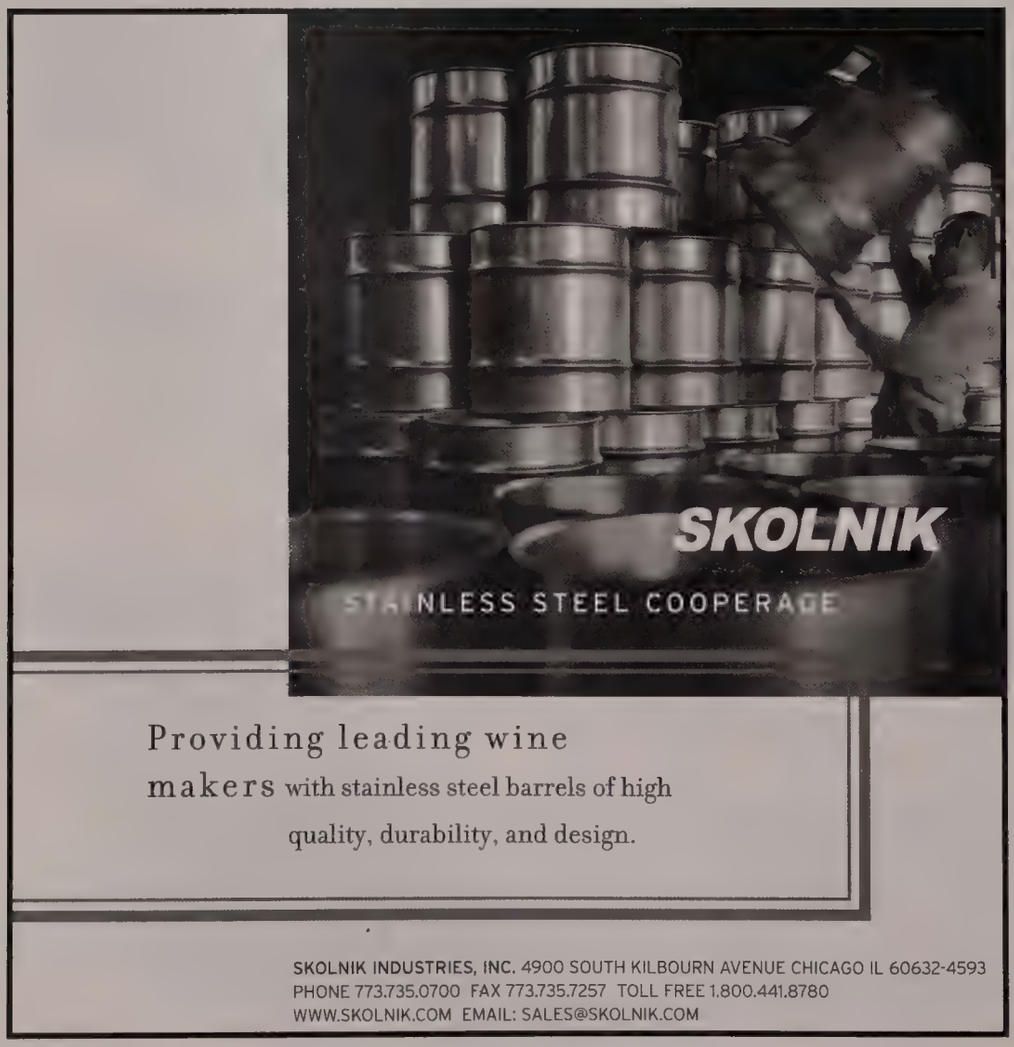
A federal law granting states the power to impede alcohol trade upsets this balance of power and runs contrary to basic constitutional principles. Still, wholesalers maintain that alcohol trade is somehow different because the 21st Amendment grants states the power to regulate alcohol.

As nine U.S. Senators recently communicated in a letter to their colleagues: "[T]he Founding Fathers included the Commerce Clause in the Constitution to protect against just this kind of trade barrier between the states." The nine Senators are: Barbara Boxer (D-CA), Richard Burr (R-NC), Maria Cantwell (D-WA), Dianne Feinstein (D-CA), Kay Hagan (D-NC), Tim Johnson (R-W), Jeff Merkley (D-OR), Patty Murray (D-WA), and Ron Wydfen (D-OR).

The Supreme Court opinion in *Granholm v. Heald* explicitly states: "[T]he Twenty-first Amendment does not supersede other provisions of the Constitution."

This reality is exactly why wholesalers are back at the federal trough. They want the federal government to delegate its commerce power to states — validating state laws that serve wholesalers and trample the freedoms of everyone else. ■

Angela Logomasini has a Ph.D. in American Government and is senior fellow at the Competitive Enterprise Institute.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26 viticulture/enology research projects funded by AVF in 2011

American Vineyard Foundation (AVF) is providing more than one million dollars for research in 2011 by funding 26 grant proposals. To further stretch project funding, the AVF collaborated with other wine and grape industry funding organizations such as the California Table Grape Commission, Oregon Wine Board, California Raisin Marketing Board, California Grape Rootstock Improvement Commission, and Grapevine Improvement Advisory Board when possible.

The role played by AVF to support viticulture and enology research became critical in 2011 following public cuts to other industry research funding programs. Federal support for the Viticulture Consortium West (VCW) and state support for the California Competitive Grants Program for Viticulture and Enology (CCGPVE) were eliminated for 2011, leading to a 40% reduction in money available for industry research. AVF, which relies on voluntary contributions from industry growers and vintners, was able to perpetuate ongoing projects and fund a few new high-priority proposals.

"While we are disappointed about federal and state program cuts that have led to a reduction in overall research investments," remarks AVF Chairman Jim Frisinger, "we are pleased that the generous support from our growers and vintners has allowed AVF to maintain an impressive level of industry research funding."

Each proposal was carefully considered by one of six industry review panels based on scientific merit, ability to achieve objectives, and importance to the industry. AVF members are surveyed on a periodic basis to identify which topics are most in need of research. These results are then posted on the AVF website, giving researchers and research institutions an opportunity to craft proposals to address grape and wine industry needs.

AVF research grants and total of awards in each category are shown in the Table.

Number of Projects	Project Type	Funding Amount
6	Breeding and Germplasm	$168,235
6	Enology	$302,600
5	Cultural Practices	$270,778
4	Disease Management	$163,280
3	Pest Management	$189,776
2	Education and Outreach	$49,495
AVF TOTAL for 2011		**$1,144,495**

The AVF provides a unique opportunity to unify the industry through an industry-wide research effort to maintain this progress. For more information visit www.avf.org. ■

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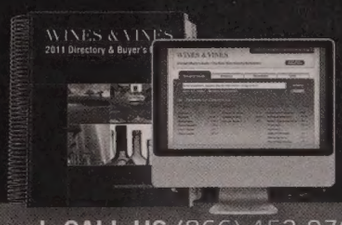

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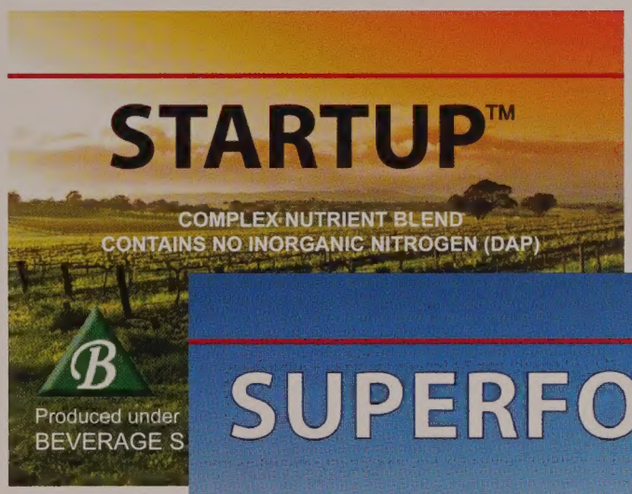

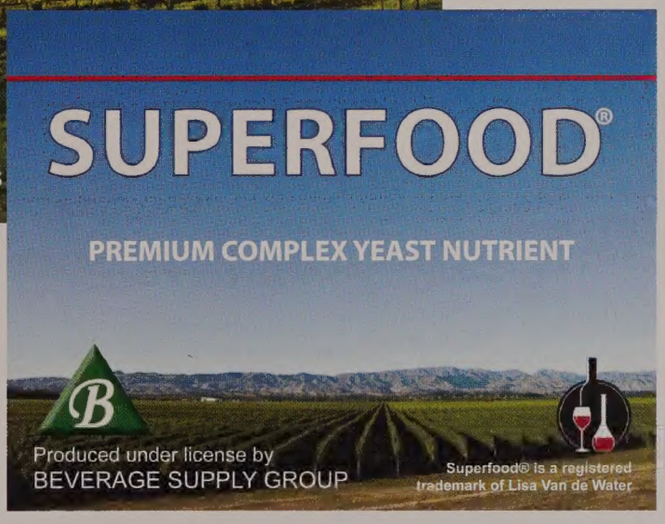
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